

# मुक्त शिक्षा



# OPEN LEARNING

राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान के शिक्षार्थियों के लिए सचेतक पत्रिका

An Awareness Magazine for the NIOS Learners

जनवरी-जून 2013

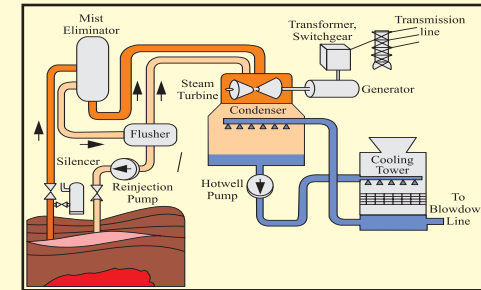
January-June 2013

इस अंक में

- एक अद्वितीय अनुकरणीय स्वप्नदर्शी इंजीनियर : भारत रत्न सर मोक्षगुण्डम् विश्वेश्वरैया
- विज्ञान समाचार
- लाई डिटेक्शन मशीन
- विद्यार्थी जीवन में नैतिक शिक्षा की आवश्यकता
- हिन्दी भाषा समर्थ होते हुए भी असमर्थ क्यों
- कविता : एक बूँद

In this Issue

- Geothermal Energy: A Natural Source of Energy
- Srinivasa Aiyangar Ramanujan: A Genius Mathematician
- Role of Teachers and Parents in Cultivation of Good Habits among Students
- Basic Infrastructure to Achieve Goal of Universal Elementary Education
- How to Score Good Marks in Chemistry
- Importance of Yoga for Young Learners
- That Lost Tiara: The Condition of a Girl Child In India
- Poem : Leisure



विद्याभ्यन्तम् सर्वस्य प्रथमम्

राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान  
NATIONAL INSTITUTE OF OPEN SCHOOLING



**Bharat Rathna**  
**Sir MOKSHAGUNDAM VISVESVARAYA**  
**1860-1962**

## **Bharat Ratna**

### **Sir Mokshagundam Visvesvaraiyah**

**Mokshagundam Vishveshwariyah**, KCIE, (popularly known as **Sir MV**; 15 September 1861) was a notable Indian engineer, scholar, statesman and the Diwan of Mysore during 1912 to 1918. He was a recipient of the Indian Republic's highest honour, the Bharat Ratna, in 1955. He was knighted as a Commander of the British Indian Empire by King George V for his myriad contributions to the public good. Every year, 15 September is celebrated as Engineer's Day in Indian in his memory. He is held in high regard as a pre-eminent engineer of India. He was the chief designer of the flood protection system for the city of Hyderabad, now capital city of Andhra Pradesh, as well as the chief engineer responsible for the construction of the Krishna Raja Sagara dam in Mysore. He was born in Muddenahalli in Karnataka state.

#### **Personal details**

<b>Born</b>	September 15, 1861, Muddenahalli, Chikballapur, Kingdom of Mysore (now in Karnataka)
<b>Died</b>	April 14, 1962 (aged 101), Bangalore
<b>Nationality</b>	Indian
<b>Occupation</b>	Engineer, Diwan

## *From the Chairman's Desk...*



Dear Learners of NIOS,

It gives me pleasure to inform you that the National Institute of Open Schooling (NIOS) is celebrating its Silver Jubilee Year 2013. During this year, we have rededicated ourselves to work with zeal for quality assurance in the open schooling programmes and provide such inputs in this system that would prove more useful for NIOS learners.

You may be aware that in its journey since inception on 23 November 1987, NIOS has attained the status of the largest open school in the world. The first batch of NIOS comprised of a few thousand learners. Now about five lakh learners are enrolled in one year in the Secondary, the Senior Secondary and the Vocational Education Courses. NIOS has made a significant provision that an enrolled learner can complete his chosen academic course from one year to five years period. With provision of appearing in the first term end examination in about one year time, one can appear in subsequent examinations two times in one year. This flexibility of accumulation of credit enables the learner to complete a course of study from a period of one year to five years as per his/her pace of learning. It may be pointed out that such facility is not available in the Formal Schooling System. During the Silver Jubilee Year of NIOS, we are endeavouring to ensure that all learners of NIOS should take benefit of Personal Contact Programme (PCP). A framework in this regard has been prepared for implementation.

As a sort of rehearsal to be ready for the term end examinations, the NIOS learners are expected to attempt three assignments per subject. We are trying to ensure that Assignments Response Sheets of learners are meticulously evaluated by the tutors at the study centers, and Tutor Marked Assignments (TMA) are disused in PCP classes. The concept of TMA is somewhat akin to the concept of Comprehensive and Continuous Evaluation (CCE) in the Formal Schooling System. The need and importance of TMA cannot be overemphasised. During the Silver Jubilee Year, we have planned to enrich the printed study materials with

strong inputs of the Multi Media Programmes and ICT programmes. The Web Radio programme has already been put in operation. Our academic faculty has been working hard to make the Web Radio programme as an exemplar input in the open and distance learning (ODL) mode of education. The usual audio and video programmes of NIOS are being upscaled substantially for benefit of learners. Our endeavour is to ensure that NIOS learners may not be in disadvantageous position vis – a – vis the students of the formal education system who avail opportunity of day to day interaction with their school teachers. The increasing use of ICT and several other inputs in the open schooling programmes of NIOS have potential to enrich NIOS learners to be at par with the students of Formal Schools.

There are moments when a big thrust needs to be given to put a system on a sound pedestal. And for the open schooling system that moment is now. In the Silver Jubilee Year of NIOS, our resolve is to put the open schooling system on a sound pedestal.

I have given an inkling of some initiatives and steps that are directly in the interest of NIOS learners. There are several other programmes that we are planning and implementing to strength the open schooling system.

In this context, I am placing the January–June 2013 issue of the Open Learning Magazine before you. In this magazine articles on certain significant themes/topics related to science, scientists moral education, language, role of teachers and parents, universalisation of elementary education, yoga, etc., have been included. I am confident that you will read these articles with interest for addition to your knowledge.

My good wishes to all of you.

**S. S. Jena**  
Chairman, National Institute of Open Schooling



## अध्यक्ष की कलम से



प्रिय शिक्षार्थियों

मैं अत्यंत हर्ष के साथ आपको सूचित कर रहा हूँ कि इस वर्ष हम अपना रजत जयंती वर्ष 2013 बड़े उल्लास के साथ मना रहे हैं। इस वर्ष हमने पुनः मेहनत से कार्य करने का संकल्प लिया है। हम शिक्षार्थियों में एनआईओएस के क्रियाकलापों की गुणवत्ता के प्रति विश्वास को मजबूत करने एवं अपने शैक्षिक व व्यावसायिक कार्यक्रमों को अधिकाधिक लाभप्रद बनाने हेतु दृढ़ संकल्प हैं। 23 नवम्बर 1989 के स्थापना दिवस से निरंतर प्रगतिशील एनआईओएस आज विश्व का सबसे बड़ा मुक्त विद्यालयी शिक्षा संस्थान बन गया है। एनआईओएस अपने प्रथम सत्र के कुछ हजार शिक्षार्थियों के नामांकन से शुरू करके आज पांच लाख से अधिक शिक्षार्थियों को प्रतिवर्ष नामांकित कर अपने विशिष्ट पाठ्यक्रम के कार्यक्रमों द्वारा लाभान्वित कर रहा है। अपनी विशिष्टता द्वारा यह शिक्षार्थियों को अपनी योग्यता व पठन गति से सीखने की सुगम सुविधा प्रदान करता है। इसमें शिक्षार्थी क्रेडिट संचयन सुविधा द्वारा पांच वर्षों की अवधि में उत्तीर्ण हो सकता है। शिक्षार्थी नामांकन के एक वर्ष पश्चात् तथा इसके बाद प्रत्येक छह महीनों के पश्चात् होने वाली परीक्षाएं दे सकता है। यह सुविधा औपचारिक शिक्षा में उपलब्ध नहीं है।

एनआईओएस के रजत जयंती वर्ष में हम इस दिशा में प्रत्यनशील हैं कि शिक्षार्थी अपने अध्ययन केन्द्र में आयोजित व्यक्तिगत संपर्क कार्यक्रमों से पूर्ण रूपेण लाभान्वित हो।

एनआईओएस की परीक्षाओं से पूर्व शिक्षार्थियों को टीएमए हल करने का अवसर दिया जाता है। हमारे द्वारा यह प्रयास किया जा रहा है कि शिक्षार्थियों द्वारा हल किए गए टीएमए का अध्ययन केन्द्रों के अध्यापकों द्वारा अच्छी तरह से मूल्यांकन किया जाए और तत्पश्चात् शिक्षार्थियों से मूल्यांकन संबंधी मुद्दों पर बातचीत की जाए। ओपन लर्निंग प्रणाली का यह क्रियाकलाप औपचारिक शिक्षा के सतत मूल्यांकन की तरह है।

अपने रजत जयंती वर्ष में स्वअध्ययन सामग्री के साथ-साथ हमने मल्टी मीडिया तथा आईसीटी सामग्री को बड़े पैमाने पर अपने शिक्षार्थियों के लाभार्थ उपलब्ध कराने का कार्यक्रम बनाया है।

नव प्रसारित वेब रेडियो कार्यक्रमों का तेजी से विस्तार किया जा रहा है। यह ओडीएल शिक्षा में अतिविशिष्ट श्रव्य सामग्री है। एनआईओएस में बहुत से दृश्य-श्रव्य कार्यक्रमों को बड़े स्तर पर शिक्षार्थियों के लाभार्थ प्रसारित किया जा रहा है।

हमारा यह प्रयत्न है कि औपचारिक शिक्षा पद्धति के समक्ष मुक्त विद्यालयी शिक्षा संस्थान के शिक्षार्थी किसी भी प्रकार की कमी महसूस न करें। जहाँ एक ओर औपचारिक शिक्षा के शिक्षार्थियों को नियमित रूप से अपने अध्यापकों के साथ अन्तःक्रिया करने का अवसर मिलता है वहीं दूसरी ओर मुक्त शिक्षा प्रणाली में स्वअध्ययन सामग्री के साथ-साथ मीडिया एवं आई.सी.टी. सामग्री, व्यक्तिगत संपर्क कार्यक्रम तथा अनुशिक्षक अंकित मूल्यांकन पत्र जैसी सेवाओं द्वारा शिक्षार्थी का सशक्तीकरण किया जाता है।

कभी-कभी ऐसे क्षण भी आते हैं जब किसी शैक्षिक प्रणाली के सशक्तीकरण के लिये बड़े तथा तेजी से कदम उठाने की आवश्यकता होती है। भारत में मुक्त शिक्षा प्रणाली के समक्ष यह क्षण आज आ गया है। एनआईओएस के रजत जयंती वर्ष में हमने ऐसी आवश्यकता को ध्यान में रखते हुए उपयुक्त कदम उठाये हैं, जिनमें कुछ का वर्णन ऊपर किया गया है।

इसी क्रम में जनवरी-जून 2013 मुक्त शिक्षा पत्रिका की प्रति आपके समक्ष है। इसमें मुख्य रूप से विज्ञान, वैज्ञानिक, नैतिक शिक्षा, भाषा, अभिभावकों एवं अध्यापकों की भूमिका, शिक्षा का सार्वभौमिकीकरण, योग आदि से संबंधित लेखों को सम्मिलित किया गया है। मुझे विश्वास है कि यह लेख आपके लिए रुचिकर एवं लाभदायक सिद्ध होंगे।

मैं आप सभी शिक्षार्थियों को अपनी शुभकामनाएँ देता हूँ।

*सितांशु*

सितांशु शेखर जेना

अध्यक्ष, राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान

## विषय - सूची/Contents

### Part-I

National Institute of Open Schooling : Precise Information

### Part-II

Articles and Poems : Hindi and English

#### हिन्दी

1. एक अद्वितीय अनुकरणीय स्वप्नदर्शी इंजीनियर : भारत रत्न सर  
मोक्षगुण्डम् विश्वेश्वरैया  
● डॉ. सुरेश चन्द्र भाटिया
2. विज्ञान-समाचार  
● डॉ. दीपक कोहली
3. लाई डिटेक्शन मशीन  
● डॉ. जे. एल. अग्रवाल
4. विद्यार्थी जीवन में नैतिक शिक्षा की आवश्यकता  
● तरुण पुनिया
5. हिन्दी भाषा समर्थ होते हुए भी असमर्थ क्यों  
● डॉ. नरेश कुमार

कविता : एक बूँद

#### English

6. Geothermal Energy: A Natural Source of Energy  
● Dr. Oum Prakash Sharma  
● Ms. Poonam Trikha

7. Srinivasa Aiyangar Ramanujan: A Genius Mathematician

- Dr. Anil Kumar Singh

8. Role of Teachers and Parents in Cultivation of Good Habits among Students

- Dr. Naresh Kumar Sachdeva

9. Basic Infrastructure to Achieve Goal of Universal Elementary Education

- Dr. Harender Raj Gautam

10. How to Score Good Marks in Chemistry

- Dr. Rajeev Prasad

11. Importance of Yoga for Young Learners

- Dr. Shruti Upreti

12. That Lost Tiara: The Condition of a Girl Child In India

- Madhuri Gautam

Poem: Leisure

### Part-III

News and Views

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*The facts and figures stated, conclusions reached and the views expressed in the articles are that of authors and the National Institute of Open Schooling is in no way responsible for their views.*

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**भाग-I****National Institute of Open Schooling : Precise Information**

- राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान
- राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान - कार्यक्रम और गतिविधियाँ
- Open and Distance Learning (ODL) System : Some Significant Characteristics
- What is NIOS ?
- Learner's Responsibilities : At a Glance
- Telephone Numbers, fax and E-mails ID of the chairman and the Heads of the Departments of NIOS
- NIOS On-Line (Ni-On) Learner Support Centre (LSC)
- National Institute of Open Schooling (NIOS) : Brief Information
- National Institute of Open Schooling : Instructional System
- भारत का संविधान : उद्देशिका
- The Constitution of India : Preamble

## राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान

राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान (एनआईओएस) (पूर्वतः राष्ट्रीय मुक्त विद्यालय) की स्थापना नवंबर 1989 में एक स्वायत्त संगठन के रूप में भारत सरकार के मानव संसाधन विकास मंत्रालय द्वारा (राष्ट्रीय शिक्षा नीति 1986 के तहत) की गई और इसका पंजीकरण सन् 1860 के संस्था पंजीकरण अधिनियम के अंतर्गत हुआ। इससे पहले यह 1979 से केन्द्रीय माध्यमिक शिक्षा बोर्ड (सीबीएसई) की एक परियोजना के रूप में कार्य कर रहा था।

राष्ट्रीय शिक्षा प्रणाली में राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान का एक महत्वपूर्ण स्थान है और इसकी अनेक महत्वपूर्ण विशेषताएँ हैं। राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान के मुख्य उद्देश्य हैं:

- विद्यालय स्तर पर सतत् एवं विकासात्मक शिक्षा के सुअवसर प्रदान करना;
- भारत सरकार और राज्यों को परामर्श सेवाएँ प्रदान करना;
- दूरस्थ शिक्षा और मुक्त शिक्षा संबंधी सूचनाओं के प्रभावी प्रसार के लिए एक संस्था के रूप में कार्य करना;
- दूरस्थ शिक्षा प्रणाली तथा राज्य मुक्त विद्यालयों में सीखने के स्तरों की पहचान करने और प्रोत्साहित करने का कार्य करना; तथा
- देश में दूरस्थ और मुक्त शिक्षा प्रणाली के स्तरों को बढ़ाने के लिए मानकीय और समन्वयात्मक भूमिका निभाना।

### राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान का मिशन

- (i) शिक्षा का सार्वभौमिकीकरण
- (ii) सामाजिक समता और न्याय को बढ़ावा देना, तथा
- (iii) एक शिक्षित समाज का विकास करना।

व्यापक तौर पर एनआईओएस के दोहरे उद्देश्य हैं। प्रथम उद्देश्य सतत् एवं विकासात्मक स्कूली शिक्षा प्रदान करना है और दूसरा मुक्त विद्यालयी शिक्षा में स्तर वृद्धि करते हुए प्रामाणिक और समन्वयन कार्य करना है। एनआईओएस के कार्यक्रम सबके लिए खुले हैं जिनमें दरकिनार किए गए समूहों, ग्रामीण युवाओं, बालिकाओं और महिलाओं, अनुसूचित जातियों, अनुसूचित जनजातियों, विभिन्न प्रकार से अक्षम व्यक्तियों और भूतपूर्व सैनिकों की शिक्षा पर विशेष जोर दिया गया है।

एनआईओएस एक परीक्षा लेने वाला और प्रमाणपत्र प्रदान करने वाला संस्थान है और इसके प्रमाणपत्र उच्चतर शिक्षा के साथ-साथ नौकरियों के लिए प्रमुख बोर्डों और संस्थाओं द्वारा मान्यता प्राप्त हैं।



## राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान कार्यक्रम और गतिविधियाँ

राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान को अक्टूबर 1990 में पूर्व-स्नातक स्तर तक के पाठ्यक्रमों में पंजीकृत विद्यार्थियों की परीक्षा लेने एवं प्रमाणपत्र प्रदान करने का अधिकार प्राप्त हुआ। राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान ने पहली बार जनवरी 1991 में माध्यमिक और उच्चतर माध्यमिक परीक्षाओं का संचालन किया। इसके द्वारा प्रदत्त प्रमाणपत्रों को भारतीय विश्वविद्यालय संघ, विश्वविद्यालय अनुदान आयोग (यू.जी.सी.), विभिन्न विश्वविद्यालयों, उच्च शिक्षा संस्थाओं, मानव संसाधन विकास मंत्रालय तथा श्रम एवं रोजगार मंत्रालय ने भी मान्यता प्रदान की है।

राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान शैक्षिक, व्यावसायिक एवं जीवन समृद्धि पाठ्यक्रम प्रदान करता है। शैक्षिक पाठ्यक्रमों में प्राथमिक, माध्यमिक एवं उच्चतर माध्यमिक पाठ्यक्रम शामिल हैं। शैक्षिक पाठ्यक्रमों में विद्यार्थी अपनी आवश्यकताओं, रुचियों और क्षमताओं के अनुसार विषयों का चुनाव करने के लिए स्वतंत्र हैं। विद्यार्थियों को शैक्षिक विषयों के साथ-साथ व्यावसायिक विषयों को लेने के लिए भी प्रोत्साहित किया जाता है जो अपने आप में एक अनोखी बात है। इससे कार्य एवं कौशलों को ज्ञान के समान ही महत्त्व प्राप्त होता है।

एनआईओएस 6 माह से 2 वर्ष की अवधि वाले व्यावसायिक शिक्षा कार्यक्रम भी चलाता है। इसमें इंजीनियरिंग और प्रौद्योगिकी, कृषि, गृह विज्ञान, स्वास्थ्य और परा चिकित्सा, शिक्षक प्रशिक्षण, व्यापार और वाणिज्य, कम्प्यूटर और आई टी के क्षेत्र में लगभग 80 पाठ्यक्रम चलाए जा रहे हैं।

एनआईओएस शिक्षा प्रदान करने के लिए अतिरिक्त संरचनागत सुविधाएँ प्रदान नहीं करता है बल्कि यह पब्लिक और राजकीय विद्यालयों की मौजूदा संरचनागत सुविधाएँ जब उपयोग में न हो तो उनका उपयोग करता है। राष्ट्रीय मुक्त विद्यालयी शिक्षा संस्थान के अध्ययन केंद्रों के नेटवर्क में शैक्षिक पाठ्यक्रमों के लिए प्रत्यायित संस्थाओं (एआई) तथा व्यावसायिक पाठ्यक्रमों के लिए प्रत्यायित व्यावसायिक संस्थाओं (एवीआई) को शामिल किया गया है। विभिन्न प्रकार के अक्षम व्यक्तियों तथा वंचितों की शैक्षिक आवश्यकताओं की पूर्ति के लिए बहुत सी विशेष प्रत्यायित संस्थाओं (एसएआईईडी) को भी अध्ययन केंद्र के रूप में मान्यता प्रदान की गई है। एनआईओएस की ये प्रत्यायित संस्थाएँ देश के विभिन्न राज्यों में स्थित हैं।

बीसवीं शताब्दी की समाप्ति के बाद एनआईओएस ने समर्पित और अनुभवयुक्त गैर सरकारी संगठनों और जिला साक्षरता समितियों के सहयोग से मुक्त बेसिक शिक्षा कार्यक्रम की शुरुआत करने का एक महत्वपूर्ण कदम उठाया है। यह कार्यक्रम 14 वर्ष से कम आयु के बच्चों तथा 14 वर्ष से अधिक आयु के प्रौढ़ों के लिए अलग-अलग ढंग से तैयार किया गया है।

इस प्रकार प्राथमिक स्तर से पूर्व स्नातक स्तर तक की ओपन स्कूलिंग कोर्सज की शृंखला पूरी होती है।

## Open and Distance Learning (ODL) System

### Some Significant Characteristics

#### *Why Open Schooling ?*

The emergence of Open and Distance Learning (ODL) System has been a natural and phenomenal evolution in the history of educational development towards the latter half of the twentieth century. While the conventional system continues to be the mainstream of educational transaction, it has its own limitations with regard to expansion, access, equity and cost effectiveness. Major challenges that India faces today in the educational arena are:

- the challenge of numbers,
- the challenge of credibility, and
- the challenge of quality.

The revolution brought about by the growth of Information and Communication Technology (ICT) has greatly facilitated the expansion of Open and Distance Learning (ODL) System and permitted adopting a flexible, constructivist, learner friendly and multiperspective approach to teaching learning process which is so essential for creativity, leadership and scholarship leading to total development of human personality and in responding appropriately to the challenges identified above.

The Open and Distance Education is a new paradigm with some elements of shift such as:

- From classroom to anywhere
- From teacher centric to learner centric
- From teacher as an instructor to teacher as a facilitator
- From mainly oral instructions to technology aided instruction
- From fixed time to anytime learning
- From “you learn what we offer” to “we offer what you want to learn”.
- From education as one time activity to education as life long activity.

The concerns for adoption of ‘open schooling’ programmes with the objective of providing “Education to All” include:

- i. to provide education to those who are unable to attend conventional schools for a variety of socio - economic reasons, as well as to those who for similar reasons missed opportunities to complete school and developmental education,
- ii. to meet the educational needs of differently abled children,
- iii. to provide wider choice of educational programmes to learners,
- iv. to provide a ‘safety net’ to school drop-outs so that they do not remain under-educated.

Every region and state of India faces, more or less, the above mentioned educational challenges.

## What is NIOS ?

NIOS is an “Open Schooling Institute” to cater to the needs of a heterogeneous group of learners up to predegree level. It was started as a project with in-built flexibilities by the Central Board of Secondary Education (CBSE) in 1979. In 1986, the National Policy on Education suggested strengthening of Open School System for extending open learning facilities in a phased manner at secondary level all over the country as an independent system with its own curriculum and examination leading to certification. Consequently, the Ministry of Human Resource Development (MHRD), Government of India set up the National Open School (NOS) in November 1989. The pilot project of CBSE on Open School was amalgamated

with NOS through a Resolution (No. F.5-24/90 Sch.3 dated 14 September 1990 published in the Gazette of India on 20 October 1990), the National Open School (NOS) was vested with the authority to register, examine and certify students registered with it up to pre-degree level courses.

In July 2002, the Ministry of Human Resource Development amended the nomenclature of the organisation from the National Institute of Open Schooling (NIOS) with a mission to provide relevant continuing education at school stage, up to pre-degree level through Open Learning system to prioritized client groups as an alternative to formal system, in pursuance of the normative national policy documents and in response to the need assessments of the people, and through it to make its share of contribution to :

- universalisation of education,
- greater equity and justice in society, and
- the evolution of a learning society.

## What does NIOS do ?

The National Institute of Open Schooling (NIOS) provides opportunities to interested learners by making available the following Courses/Programmes of Study through open and distance learning (ODL) mode.

- Open Basic Education (OBE) Programme for Children (upto 14 years), adolescents and adults at A, B and C levels that are equivalent to classes III, V and VIII of the formal school system respectively.
- Secondary Education Course
- Senior Secondary Education Course
- Vocational Education Courses/Programmes
- Life Enrichment Programmes

## HOW TO USE NIOS STUDY MATERIAL

Dear Students,

The learning material (Course Material) provided to you by the NIOS has been developed by teams of experts. The material has been developed in Self Learning Mode (SLM) to help you to study independently.

The following points will give you an idea on how to make the best use of the material:

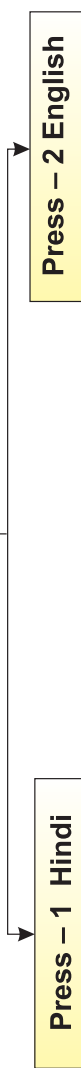
- (i) Title : Read the title. It gives you an idea about the contents of the lesson.
- (ii) Introduction : Go through it. This will introduce you to the contents of the lesson.
- (iii) Objective : Try to remember the objectives. These will be your achievement after you have learned the lesson.
- (iv) Content : The total content of the lesson is divided into sections so that you understand and master each concept before proceeding to the next section. Read the text carefully and if you require, make short notes on the margin of each page. Try to solve the given intext questions yourself and then go to next section. If you cannot do the intext questions, read them again until you can do it. At some places you will find some texts in italics and bold. This shows the importance of those portions.
- (v) Intext Questions : These will be objective type questions based on each section. After studying that section, try to solve those questions by yourself in the space given below the questions and then check your answers with the model answers given at the end of the lesson. This will help you to know your progress. Solve these in pencil and compare your answers with the key provided at the end. Go through the unit again, if your answer do not match.
- (vi) What you have learnt : This will be the summary of the learning points of the lesson. Retain these and add your own points to this list.
- (vii) Terminal Exercises : There will be short and long answer type questions in this section. Try to solve them without taking the help from 'check your answer'. After solving the questions, tally these with 'check your answer'.
- (viii) Check your answers : As explained earlier, here the answers to intext questions and terminal questions have been provided. Compare your answers with this list.

## NIOS On-line (Ni-On) Learner Support Centre (LSC)

NIOS believes and hopes that learners do not face any problem and do not have any grievance during their study. Nevertheless, NIOS has established Learner Support Centre to redress all student related issues through email, Interactive Voice Response System (IVRS) and TollFree No.

Dial 1800 180 9393

Welcome message



<b>Press 1 For Admission</b>	<b>If you have not yet registered</b> <b>Press:</b> 1. for Date of admission 2. for Admission Fees 3. for Entry requirements 4. for Subject selection <b>If you have registered</b> 1. for Admission status 2. for Dispatch I Card and Course material for Tutor Marked 3. Assignment 4. for Transfer of Credit and Re-admission 5. for Change of subject and additional subject for Any type of correction	<b>Press 2 For Examination</b>	<b>Press:</b> 1. for Payment of Examination fees 2. for Date sheet 3. for Examination Centers 4. for Change of examination center 5. for Requirements for On Demand Examination subject for Any type of correction	<b>Press 3 For Result</b>	<b>Press:</b> 1. for Secondary Result 2. for Senior Secondary Result 3. for On-Demand Examination 4. for Re-checking for Mark sheet/migration or Provisional Certificates 6. for Duplicate documents	<b>Press 4 For Academic</b>	<b>Press:</b> 1. for courses offered by NIOS 2. for equivalency of NIOS Certificate instructions 3. for Medium of Paper, Syllabus and privies year Q.P. 4. for Sample Question 5. for Choice of subjects 6. for Personal Contact Programme (PCP)	<b>Press 5 For Vocational</b>	<b>Press:</b> 1. for Courses & fees charged 2. for Accredited Vocational Institutes 3. for Study Material and Evaluation process 4. for Examination Enrichment Courses 5. for Life Enrichment Courses	<b>Press 6 For Life Skill</b>	<b>Press:</b> 1. for Body Information 2. for Substance Abuse 3. for Relationship Diseases 4. for Sexual Diseases	<b>Press 7 For Accreditation</b>	<b>Press:</b> 1. for Processing fee required 2. for Documents required 3. for Process of accreditation 4. for status of Application	<b>Press 9 To speak to executive</b>	<b>To speak to executive</b>
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Press \* To go back to previous menu      Press 9 Speak to executive



## National Institute of Open Schooling (NIOS) : Brief Information

<b>Setting up of NIOS</b>	<ul style="list-style-type: none"> <li>• Started as a project on “Open Schooling” under the Central Board of Secondary Education (CBSE) in 1978.</li> <li>• Established in 1989 as the National Open School (NOS) by the Govt. of India, Ministry of Human Resource Development(MHRD).</li> <li>• In 1990, the Govt. of India through a Gazette notification vested NOS with the authority to examine and certify learners registered with it up to Pre-Degree level Courses.</li> <li>• Re-christened as the National Institute of Open Schooling (NIOS) in July 2002.</li> </ul>
<b>Regional Centres-18</b>	Allahabad, Bhopal, Chandigarg, Delhi, Guwahati, Hyderabad, Jaipur, Kolkata, Kochi, Patna, Pune, Dehradun, Bhubaneswar, Bengaluru, Gandhinagar, Raipur, Ranchi, Chennai <b>Sub-Regional Centres</b> Darbhanga, Visakhapatnam <b>Cell Port Blair</b>
<b>Study Centres</b>	The Study Centres are known as Accredited Institutions (AIs) for Academic Courses, Accredited Vocational Institutions (AVIs) for Vocational Education Courses and Accredited Agencies (AAs) for Open Basic Education (OBE) courses.
<b>Largest Open Schooling System in of the world</b>	NIOS is the largest Open Schooling System in the world. <ul style="list-style-type: none"> <li>• Admission in NIOS is 100% Online for Sec. (10th), Sr.Sec. (12th).</li> <li>• Admission is open round the year with cut-off</li> <li>• 1st March - 31st August for forthcoming April Exam.</li> <li>• 1st Sep. - 28th Feb. for forthcoming October Exam.</li> <li>• Four Streams of Admission</li> </ul>
<b>Courses Offered</b>	<ul style="list-style-type: none"> <li>• Open Basic Education (OBE) (A level, B level, C level equivalent to Class III, V, VIII respectively of formal Education) courses are offered through Accredited Agencies (AAs) under Elementary Education.</li> <li>• Secondary – leading to Secondary School Certificate.</li> <li>• Senior Secondary – leading to Senior Secondary School Certificate.</li> <li>• Open Vocational Education.</li> <li>• Life Enrichment Programmes.</li> </ul>
<b>Highlights and flexibilities</b>	<ul style="list-style-type: none"> <li>• Freedom to choose subjects; continuous assessment through Tutor Marked Assignments (TMA).</li> <li>• Facility of 100% On Line Registration for Admission and Examination</li> <li>• Credit accumulation facility; 9 chances in 5 Years to complete a course; Provision of Readmission after 5 years.</li> <li>• Learning support through Personal Contact Programme (PCP); Transfer of credits (up to 2 subjects) from some other Boards.</li> <li>• Media Programmes are telecast and broadcast.</li> </ul>
<b>Study Materials</b>	Printed Self Instructional study materials supported by Audio-Video programmes. A half yearly Magazine “Open Learning” is also published for benefit of learners.
<b>Mediums of Instruction</b>	<ul style="list-style-type: none"> <li>• Hindi, English, Urdu, Marathi, Telugu, Gujarati, Oriya and Malayalam mediums at Secondary stage.</li> <li>• Hindi, English, Urdu mediums at Sr. Secondary stage.</li> </ul>

<b>Certification</b>	Total No of Learners certified since 1991-2011-12 (Sec.+Sr. Sec.+Voc) =2660266 Total No of Learners Certified under OBE = 455636
<b>National Consortium for Open Schooling</b>	<ul style="list-style-type: none"> <li>• NIOS provides Professional support to States to set up and develop State Open Schools particularly with Regional Mediums. The secretariat of NCOS is located in NIOS.</li> <li>• State Open Schools (SOSs) have been set up in 17 states viz., Rajasthan, Andhra Pradesh, Madhya Pradesh, Punjab, Tamil Nadu, West Bengal, Haryana, Karnataka, Kerala, Jammu &amp; Kashmir, Uttar Pradesh, Assam, Chhattisgarh, Delhi, Himachal Pradesh, Gujarat and Bihar.</li> </ul>
<b>Commonwealth Open Schooling Association (COMOSA)</b>	<p>The COMOSA is a non-profit, democratic, collaborative and futuristic organization based on mutual respect and committed to support the efforts of open schooling institutions. The basic objective of the association is to cooperate and collaborate in development, promotion and introduction of innovative, high quality, relevant, equitable, gender-sensitive and cost-effective programmes of school education for sustainable development in commonwealth countries through Open and Distance Learning Mode, and thereby targeting to achieve the Millennium Development Goals (MDGs) of the United Nations.</p> <p>The Chairman, National Institute of Open Schooling (NIOS), India (Dr. S. S. Jena) has been elected as the first Chairperson of the COMOSA. It was also resolved by the members of COMOSA to have its first Secretariat located at NIOS Campus, NOIDA (India) 201309.</p>
<b>Web-site</b>	<a href="http://www.nios.ac.in">http://www.nios.ac.in</a>
<b>Learner Support Centre</b>	Toll Free : 18001809393
<b>Mukta Vidya Vani</b>	Toll Free : 18001802543

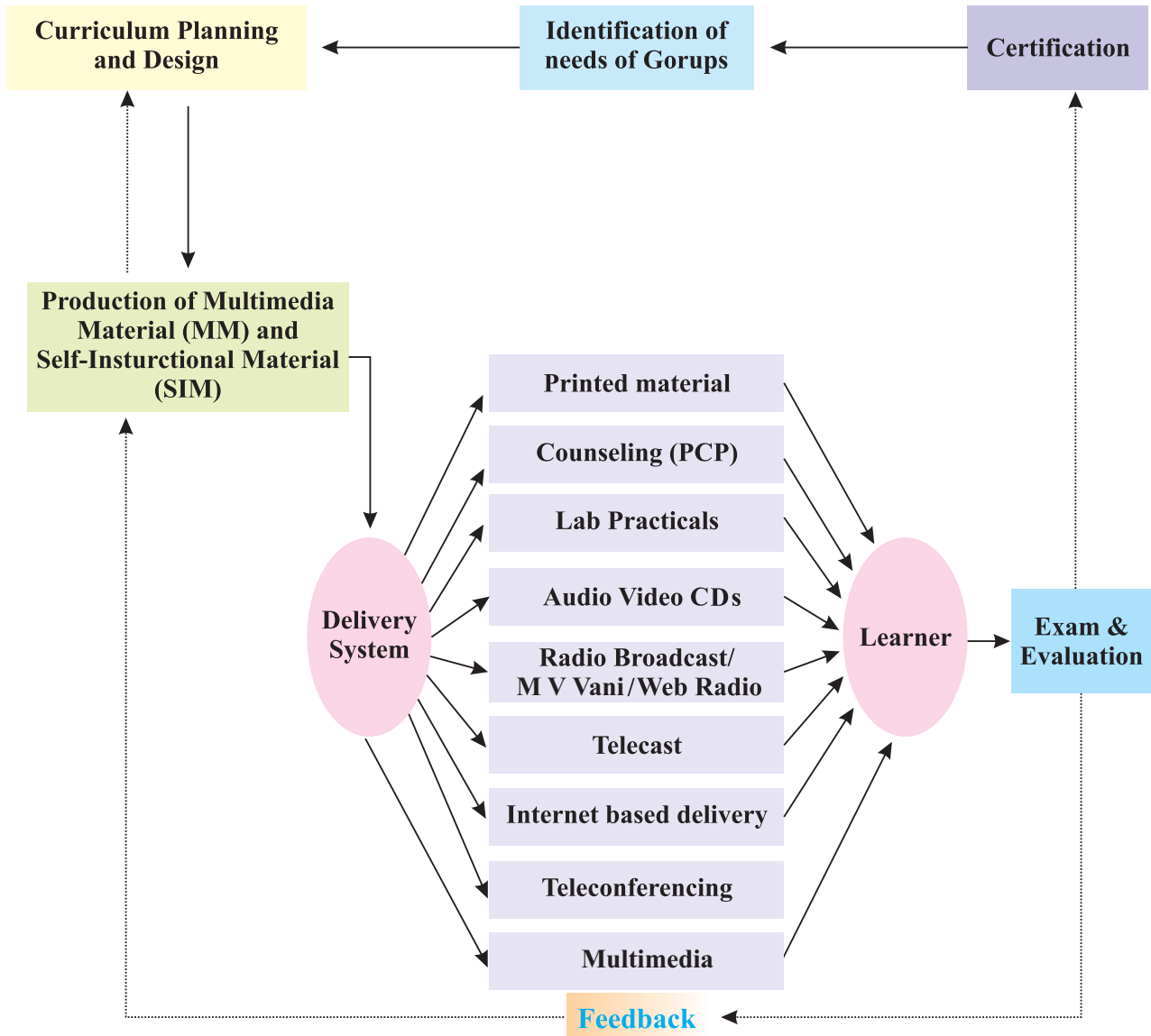
## NIOS receives National Award for Best Accessible Website



Hon'ble President of India, Sh. Pranab Mukherjee presenting the award to Dr. S.S. Jena, Chairman, NIOS

# National Institute of Open Schooling

## Instructional System



*NIOS strives to establish an Open Schooling System that touches and changes life of individuals and of society*



## उद्देशिका

हम, भारत के लोग, भारत को एक [संपूर्ण प्रभुत्व—संपन्न समाजवादी पंथनिरपेक्ष लोकतंत्रात्मक गणराज्य] बनाने के लिए, तथा उसके समस्त नागरिकों को:

सामाजिक, आर्थिक और राजनैतिक न्याय,  
विचार, अभिव्यक्ति, विश्वास, धर्म  
और उपासना की स्वतंत्रता,  
प्रतिष्ठा और अवसर की समता

प्राप्त कराने के लिए,  
तथा उन सब में

व्यक्ति की गरिमा और [राष्ट्र की एकता  
और अखंडता] सुनिश्चित करने वाली बंधुता

बढ़ाने के लिए

दृढसंकल्प होकर अपनी इस संविधान सभा में आज तारीख 26 नवम्बर, 1949 ई० (तिथि मार्गशीर्ष शुक्ला सप्तमी, संवत् दो हजार छह विक्रमी) को एतद्द्वारा इस संविधान को अंगीकृत, अधिनियमित और आत्मार्पित करते हैं।

- 1 संविधान (बयालीसवां संशोधन), अधिनियम, 1976 की धारा 2 द्वारा (3-1-1977 से) "प्रभुत्व—संपन्न लोकतंत्रात्मक गणराज्य" के स्थान पर प्रतिस्थापित।
- 2 संविधान (बयालीसवां संशोधन), अधिनियम, 1976 की धारा 2 द्वारा (3-1-1977 से) "राष्ट्र की एकता" के स्थान पर प्रतिस्थापित।





# The Constitution of India



## PREAMBLE

WE, THE PEOPLE OF INDIA, having solemnly resolved to constitute India into a <sup>1</sup>[SOVEREIGN SOCIALIST SECULAR DEMOCRATIC REPUBLIC] and to secure to all its citizens:

**JUSTICE**, social, economic and political;

**LIBERTY**, of thought, expression, belief, faith and worship;

**EQUALITY** of status and of opportunity;

and to promote among them all

**FRATERNITY** assuring the dignity of the individual and the <sup>2</sup>[unity and integrity] of the Nation;

IN OUR CONSTITUENT ASSEMBLY this twenty-sixth day of November, 1949, DO HEREBY ADOPT, ENACT AND GIVE TO OURSELVES THIS CONSTITUTION.

<sup>1</sup> Ssubstituted by the Constitution (Forty-second Amendment) Act, 1976, s. 2, for "SOVEREIGN DEMOCRAIC REPUBLIC" (w.e.f. 3-1-1977)

<sup>2</sup> Ssubstituted by s. 2., ibid., for "Unity of the Nation" (w.e.f. 3-1-1977)



**भाग-II****Articles in Hindi and English****Page No.****हिन्दी**

- एक अद्वितीय अनुकरणीय स्वप्नदर्शी इंजीनियर : भारत रत्न सर मोक्षगुण्डम् विश्वेश्वरैया 1
- विज्ञान-समाचार 5
- लाई डिटेक्शन मशीन 8
- विद्यार्थी जीवन में नैतिक शिक्षा की आवश्यकता 11
- हिन्दी भाषा समर्थ होते हुए भी असमर्थ क्यों 13

**English**

- Geothermal Energy: A Natural Source of Energy 15
- Srinivasa Aiyangar Ramanujan: A Genius Mathematician 19
- Role of Teachers and Parents in Cultivation of Good Habits among Students 22
- Basic Infrastructure to Achieve Goal of Universal Elementary Education 26
- How to Score Good Marks in Chemistry 29
- Importance of Yoga for Young Learners 35
- That Lost Tiara: The Condition of a Girl Child In India 40

**Poem**

- Leisure 41
- एक बूँद 42

## *Mukta Vidya Vani*



Mukta Vidya Vani is a pioneering initiative of the National Institute of Open Schooling (NIOS) for using Streaming Audio for educational purposes. This application of ICT will enhance accessibility as well as quality of programme delivery of NIOS Programmes. This is a rare accomplishment of NIOS as the first Open and Distance Learning Institute to start a two way interaction with its learners, using streaming audio and the internet.

Keeping in mind the fact that the transmission is done through the web, the NIOS website ([www.nios.ac.in](http://www.nios.ac.in)) has a link that will take any user to the Mukta Vidya Vani. Mukta Vidya Vani thus enables a two way communication with any audience that has access to an internet connection, from the studio at its Headquarters in NOIDA, where NIOS has set up a state-of-art studio, which will be used for this purpose as well as for recording educational audio programmes meant for NIOS learners, though others can also take advantage of this facility.

Mukta Vidya Vani is a modern interactive, participatory and cost effective programme, involving an academic perspective along with the technical responsibilities of production of audio and video programmes, which are one of the most important components of the multi channel package offered by the NIOS. These programmes will attempt to present the topic/ theme in a simple, interesting and engaging manner, so that the learners get a clear understanding and insight into the subject matter.

NIOS has launched a scheme to motivate the learners to participate in the Mukta Vidya Vani by sending their Audio CD's to the respective regional centre on various subjects such as-

1. Poetry / Shloka recitation
2. Story telling
3. Radio Drama
4. Music
5. Talks on various topic related to the NIOS curriculum including Painting, Vocational Subjects etc.
6. Quiz
7. Mathematics puzzles etc.

The selected CD can be webcast on Mukta Vidya Vani and the winner participant be rewarded suitably.

Learners may visit the NIOS website and participate in live programmes from 2pm to 5pm on all working days and from 10.30am to 12.30pm on Saturdays, Sundays and all Public Holidays. The Subject Experts in the Studio will respond to their telephonic queries during this time. A weekly schedule of the programmes for webcast is available on the NIOS website. The Studio telephone number are 0120-4626949 and Toll Free No. 1800-180-2543.



## एक अद्वितीय अनुकरणीय स्वप्नदर्शी इंजीनियर : भारत रत्न सर मोक्षगुण्डम् विश्वेश्वरैया

□ डॉ. सुरेश चन्द्र भाटिया

भारतरत्न मोक्षगुण्डम् विश्वेश्वरैया का स्मरण करते ही हमारे सामने विविधता से परिपूर्ण एक ऐसे महापुरुष की छवि उजागर होती है, जो एक अद्वितीय इंजीनियर, वैज्ञानिक एवं शिक्षाविद होने के साथ-साथ एक दूरदर्शी राजनीतिज्ञ एवं कुशल प्रशासक के रूप में भी प्रतिष्ठित हुए।

### बाल्यकाल

15 सितम्बर, 1861 को कर्नाटक प्रदेश (मैसूर) के कोलार जिले में मदनहल्ली गाँव में एक प्रतिभाशाली बालक का जन्म हुआ, जो आगे चलकर एक अद्वितीय इंजीनियर के रूप में पुष्पित हुआ। यह एक आश्चर्यजनक संयोग ही था कि सन् 1861 में ही भारत में विश्वेश्वरैया के जन्म के साथ ही अनेक प्रतिभाशाली व्यक्तियों का भी जन्म हुआ, जिनमें श्री मोतीलाल नेहरू, पं. मदन मोहन मालवीय एवं गुरुदेव रवीन्द्रनाथ टैगोर प्रमुख हैं।

उनके पिता श्री श्रीनिवास शास्त्री एक प्रतिष्ठित विद्वान एवं धार्मिक, परन्तु अत्यन्त गरीब एवं साधारण व्यक्ति थे। युवा विश्वेश्वरैया के जमाने में भारत की जनता विदेशी शासन से दबी, अज्ञान व सामाजिक संकीर्णता से घिरी थी एवं नागरिकों का जीवन स्तर अन्य समृद्ध देशों की तुलना में बहुत नीचे था। यह देखकर उन्हें बहुत दुख हुआ और वे सदा यही सोचते कि किस प्रकार नागरिकों का जीवन स्तर उच्च करने के प्रयास किए जाएँ। उनका सपना भारत को एक ऐसा समृद्ध व सम्पन्न देश बनाने का था, जिसके सभी नागरिक आधुनिक विज्ञान से प्राप्त सुख-सुविधा का लाभ उठा सकें। इस उद्देश्य की पूर्ति के लिए ही विश्वेश्वरैया ने अपना सारा जीवन लगा दिया। वे बराबर यह सोचते कि किस प्रकार उन्हें ऐसी बड़ी योजनाओं को बनाने के अवसर मिले, जिससे बाढ़ें रोकी जा सकें, सिंचाई की जा सके, बिजली बनाई जा सके और कल-कारखाने खोले जा सकें।

### शिक्षा

विश्वेश्वरैया की प्राथमिक शिक्षा अपने गाँव से 3 मील दूर चिकबलपुर के स्कूल में हुई। इनकी कड़ी मेहनत और पढ़ाई के प्रति लगाव को देखकर अध्यापक ने इन्हें आगे की पढ़ाई के लिए बंगलोर (वर्तमान बंगलुरु) जाने के लिए प्रेरित किया, जिससे कि वे वहाँ जाकर मैट्रिक की परीक्षा की तैयारी करें। आगे की पढ़ाई का निश्चित ध्येय बनाकर विश्वेश्वरैया ने अप्रैल, 1875 में अपने गाँव से लगभग 40 मील दूर बंगलोर तक की यात्रा पैदल व बैलगाड़ी के द्वारा पूरी करके अपने मामा श्री रामया के घर पहुँचकर उन्हें आश्चर्यचकित कर दिया।



अपने मामा के सामने उन्होंने आगे पढ़ने की इच्छा प्रकट की और साथ ही आत्मसम्मान प्रदर्शित करते हुए मामा के ऊपर भार न बनने का निश्चय किया। वह मामा के घर भोजन करते तथा फीस के लिए ट्यूशन पढ़ाते। बंगलोर में वेसलेन मिशन हाईस्कूल व सेन्ट्रल कॉलेज में पढ़ाई करके सन् 1876 में उन्होंने हाईस्कूल परीक्षा पास की तथा सन् 1880 में स्नातक की परीक्षा में प्रथम स्थान प्राप्त किया। सेन्ट्रल कॉलेज के प्रिंसिपल चार्ल्स वाटर्स इनकी योग्यता, प्रतिभा एवं कार्य-कुशलता से अत्यन्त प्रभावित हुए व इन्हें विज्ञान और गणित की आगे की पढ़ाई के लिए प्रेरित किया। मैसूर राज्य से छात्रवृत्ति मिलने पर विश्वेश्वरैया ने पूना के साइंस कॉलेज में प्रवेश लिया। इसी कॉलेज का नाम बाद में पूना इंजीनियरिंग कॉलेज रखा गया। यहीं से सन् 1883 में उन्होंने मुम्बई विश्वविद्यालय की सिविल इंजीनियरिंग परीक्षा (एल.सी.ई.) प्रथम स्थान सहित पास की।

□ डॉ. सुरेश चन्द्र भाटिया, पूर्व मुख्य अभियंता (डिज़ाइन), सेल-बोकारो, 284, सेक्टर - 1, चिरंजीव विहार, गाजियाबाद-201002

## सहायक अभियन्ता से अधीक्षण अभियन्ता

बम्बई विश्वविद्यालय की इंजीनियरिंग परीक्षा में प्रथम स्थान प्राप्त करने पर उन्हें बम्बई प्रेसीडेन्सी के सार्वजनिक निर्माण विभाग में सीधे ही सहायक अभियन्ता के पद पर नियुक्त कर दिया गया। सन् 1884 में यह पद संभालने के समय उनकी आयु केवल 23 वर्ष थी। अल्प समय में ही अपने असाधारण कार्य-कुशलता, कार्य-क्षमता और योग्यता के बलबूते पर उन्हें पदोन्नति मिली और वे अधीक्षण अभियन्ता बने। किसी भी भारतीय के सीधे असिस्टेंट इंजीनियर पद पर नियुक्ति और अल्प समय में ही सुपरिन्टेंडिंग इंजीनियर पद पर पदोन्नति उस समय बड़े गौरव की बात थी। विश्वेश्वरैया अपनी योग्यता के कारण मुख्य अभियन्ता के पद पर आसीन होने वाले थे, लेकिन अंग्रेज इंजीनियरों ने एक भारतीय को चीफ इंजीनियर बनाने का विरोध किया और उन्हें यह पद नहीं दिया गया। इससे क्षुब्ध होकर सन् 1908 में उन्होंने सरकारी नौकरी से त्यागपत्र दे दिया।

## बांधों तथा जलापूर्ति योजनाओं का निर्माण कार्य

ब्रिटिश शासित बम्बई प्रेसीडेन्सी में सरकारी नौकरी के दौरान ही 1891 में उन्होंने सिन्धु प्रान्त में सक्कर बाँध का निर्माण कराया तथा 1899 में सिंचाई के ब्लॉक सिस्टम तथा स्वचालित स्लूइस गेट का आविष्कार किया, जिससे पूना के निकट खड़कवासला जलाशय की क्षमता में लगभग 25 प्रतिशत की वृद्धि हो सकी और पूना शहर की जलापूर्ति सुनिश्चित की जा सकी। चूँकि पूना के निकट ही सैनिक संस्थान भी थे, इसलिए पूना नगर की जलापूर्ति योजना अपने आप में एक उपलब्धि थी, जिसकी प्रशंसा भारत के तत्कालीन प्रधान सेनापति लॉर्ड किशनर तथा बम्बई के तत्कालीन गवर्नर लॉर्ड सिंडेनहम ने भी की थी।

## अद्वितीय तथा अनुकरणीय इंजीनियर

सन् 1908 में जब मूसी और ईसा नदियों की भयंकर प्रलयकारी बाढ़ से हैदराबाद शहर तहस-नहस हो चुका था, तब निजाम हैदराबाद ने एक विशेष आग्रह भेजकर हैदराबाद शहर को बाढ़ की विभीषिका से बचाने का आग्रह किया। यहाँ विश्वेश्वरैया ने उस्मान सागर व हिमायत

सागर बाँध एवं जलाशय परियोजनाएँ तैयार कीं तथा शहर से जल-मल निकास की विस्तृत रूप-रेखा तैयार की और बड़ी चौड़ी सड़कों आदि के साथ आधुनिक हैदराबाद शहर का पुनर्निर्माण कराया। सन् 1909 में मैसूर महाराजा ने विश्वेश्वरैया को मैसूर राज्य में मुख्य अभियन्ता नियुक्त किया। यहाँ उन्होंने कावेरी नदी पर कृष्णराजा सागर बाँध का निर्माण कराया। बाँध बनने से पूर्व ही बड़े-बड़े अंग्रेज इंजीनियरों ने कहा था कि यह बाँध नहीं बन सकता और इस पर लगने वाला करोड़ों रुपया व्यर्थ ही जाएगा।

परन्तु नाना प्रकार की कठिनाइयों का सामना करते हुए उन्होंने सन् 1912 में इस बाँध का निर्माण कार्य पूरा कराया तथा उससे चलने वाली विद्युत परियोजना का कार्य भी समय से पूरा किया। उस समय यह विश्व की एक प्रमुख परियोजना थी और इसकी पूर्णता पर राष्ट्रपिता महात्मा गाँधी ने इस भारतीय इंजीनियर की असाधारण तकनीकी योग्यता की भूरि-भूरि प्रशंसा की। कृष्णराजा सागर बाँध के निर्माण से देश में ही नहीं वरन् सारे विश्व में उन्हें ख्याति प्राप्त हुई।

## मैसूर राज्य के दीवान

सन् 1912 में सर विश्वेश्वरैया को मैसूर राज्य का दीवान-प्रधानमंत्री- नियुक्त किया गया। उन्हें दीवान बनाने पर भारतीय प्रशासनिक सेवाओं के सदस्यों ने घोर विरोध व आश्चर्य प्रकट किया। अपनी योग्यता एवं पुरुषार्थ के बल पर वे 1912 से 1918 तक मैसूर राज्य के दीवान रहे। इस दौरान उन्होंने मैसूर राज्य में अनेक उद्योग स्थापित किए, जिनमें भद्रावती में स्थापित मैसूर आयरन एवं वुडवर्क्स प्रमुख हैं। सन् 1923 में भारत में तीसरा एकीकृत इस्पात कारखाना दक्षिण भारत में भद्रावती में भारतरत्न सर मोक्षगुण्डम् विश्वेश्वरैया के अथक प्रयत्नों के फलस्वरूप, एक अत्यन्त छोटी इकाई के रूप में मैसूर आयरन-स्टील एण्ड वुडवर्क्स-की स्थापना की गई।

## कच्चे लोहे का उत्पादन

इसके लिए भद्रावती के आस-पास के घने जंगलों से लकड़ी एकत्रित की जाने लगी। इस प्रकार एकत्रित की गई लकड़ी को वुड डिस्टिलेशन प्लान्ट में आग के भभके से जलाकर उसे कच्चे कोयले - चारकोल - में परिवर्तित किया गया, जिसे लौह अयस्क खनिज के साथ भट्टी में

डालकर इस्पात उत्पादन किया जाने लगा। सन् 1936 में इसका विस्तार करके इसमें इस्पात उत्पादन हेतु इस्पात गलनशाला तथा रोलिंग मिल की स्थापना की गई। सर विश्वेश्वरैया ने भद्रावती के पास उपलब्ध लौह अयस्क के अपार भंडार और आस-पास के घने जंगलों से लकड़ी प्राप्त करके, उससे कच्चा कोयला बनाकर एवं स्थानीय लोगों को कारखाने में काम पर लगाकर, बहुत कम लागत पर इस्पात उत्पादन करने में सफलता प्राप्त की। दुर्भाग्यवश उन्हीं दिनों अन्तर्राष्ट्रीय बाजार में लोहे की कीमत 100 रुपये प्रति टन से घटकर केवल 45 रुपये प्रति टन रह गई।

यद्यपि इन दिनों विश्वेश्वरैया को अनेक व्यक्तियों की आलोचना सहनी पड़ी और निराशावादी भविष्यवाणियाँ सुनी पड़ीं। सर अल्फ्रेड चेटर्टन ने कारखाने को बन्द करने की सलाह दी। मैसूर व बम्बई के समाचार-पत्रों ने इसे सफेद हाथी की संज्ञा देते हुए लिखा कि भद्रावती वह स्थान है, जहाँ चाँदी के सिक्कों को लोहे में बदला जाता है। अन्ततः विश्वेश्वरैया के कठिन प्रयत्नों से भद्रावती में कच्चे लोहे का उत्पादन होने लगा। इसका विक्रय मूल्य इतना कम रखा गया, जितना कि अमेरिका में उत्पादन भाव भी न था। इसके फलस्वरूप कच्चे माल का उपयोग व उसी क्षेत्र के लोगों को नौकरी पर लेना ही भद्रावती के लोहे की कम कीमत का रहस्य था। भारतीय इस्पात उद्योग के लिए यह सचमुच एक आश्चर्यजनक उपलब्धि कही जा सकती है कि उस समय सर विश्वेश्वरैया ने भारत में बहुत ही कम लागत पर इस्पात उत्पादन करके, रेल व स्टीमर से उसे भारत से अमेरिका जैसे विकसित देश में ले जाकर, वहाँ के तटवर्ती क्षेत्रों में, वहाँ की उत्पादन लागत से भी कम कीमत पर इस्पात बेचने में सफलता प्राप्त की। यह इस्पात संयंत्र आजकल सेल के अन्तर्गत विश्वेश्वरैया आयरन एण्ड स्टील वर्क्स के नाम से जाना जाता है।

## ग्रामीण विकास एवं औद्योगीकरण सम्बन्धी योजनाओं के जनक

कृष्णराजा सागर बहुमुखी परियोजना के अतिरिक्त भी उन्होंने सिंचाई एवं विद्युत उत्पादन की अनेक परियोजनाओं को पूर्ण कराया। भद्रावती में मैसूर आयरन एण्ड वुडवर्क्स की स्थापना के अतिरिक्त बंगलोर की हिन्दुस्तान एयरोनॉटिक्स फैक्टरी के निर्माण में उनका विशेष योगदान रहा। उन्होंने

ग्रामीण विकास एवं औद्योगीकरण की अनेक परियोजनाएँ तैयार कीं, जिनके फलस्वरूप आज का कर्नाटक राज्य इतना अग्रणी हो सका। प्रीमियर ऑटोमोबाइल्स फैक्टरी का निर्माण, हीराकुंड बाँध परियोजना, तुंगभद्रा परियोजना एवं 90 वर्ष की आयु में बिहार में पटना के निकट गंगा नदी पर बना मोकामो सड़क-रेल पुल उनकी अन्य अनेक विशिष्ट उपलब्धियों में से है, जो सन् 1861 से 1962 तक, एक शताब्दी से अधिक तक, विश्वभर में फैली हुई हैं।

एक अद्वितीय इंजीनियर और दूरदर्शी राजनीतिज्ञ के रूप में मैसूर राज्य को इनकी देन अतुलनीय है, जिसका समुचित वर्णन करना कठिन है। आज का सुन्दर मैसूर नगर एवं प्रगतिशील कर्नाटक राज्य उनकी अभूतपूर्व कल्पनाशक्ति का जीता-जागता उदाहरण है। यहाँ की अनेक पनबिजली योजनाएँ, नदी के जल को उपयोग में लाने संबंधी योजनाएँ, बाढ़ नियन्त्रण योजनाएँ आदि विश्वेश्वरैया द्वारा परिकल्पित एवं क्रियान्वित हैं। उत्तर में गंगा नदी को दक्षिण में कावेरी नदी से जोड़ने का अद्भुत स्वप्न भी सर्वप्रथम इसी महान् इंजीनियर ने देखा था। देश में नियोजित अर्थव्यवस्था पर कार्य करने वाले वे प्रथम व्यक्ति थे।

## सौंदर्य एवं प्रकृति प्रेम के परिचायक

उनका विश्वास था कि इंजीनियरिंग परियोजनाएँ सिर्फ लोहे, धातु, सीमेन्ट, कंक्रीट एवं ईट-पत्थर से बनी हुई रचनाएँ ही नहीं, वरन् एक सौंदर्य प्रतीक भी होनी चाहिए। कावेरी नदी पर बने बाँध के समीप मनोहारी वृन्दावन उद्यान उनके सौंदर्य एवं प्रकृति प्रेम का परिचायक है। उन्होंने अभियन्ताओं को कहा था कि कभी भी किसी समस्या के एक ही पक्ष को न देखो, बल्कि विविध पक्षों को ध्यान में रखकर पूर्ण योजना का विकास करो। मैसूर की कृष्णराजा सागर बहुमुखी परियोजना इसका एक उदाहरण है, जिसमें 130 फीट ऊँचे बाँध से 50,000 मिलियन घनफीट जल संचित कर 1,25,000 एकड़ भू-भाग में सिंचाई करना तथा 3 मील लंबी सुरंग द्वारा जल निष्कासित करके कावेरी नदी के बाएँ भाग में 1,00,000 एकड़ भूमि की सिंचाई तथा इसी जल से विद्युत उत्पादन करके कोलार स्वर्ण खदानों, मैसूर तथा बंगलोर शहर तक बिजली पहुँचाना शामिल हैं। विश्वेश्वरैया शिक्षण एवं व्यावहारिक अनुभव से तो सिविल इंजीनियर थे, लेकिन प्रारंभ से ही उनका विश्वास था कि भारत की



गरीबी का उन्मूलन एवं उन्नति, औद्योगिक प्रगति के बिना संभव नहीं है। उनका कहना था—

“औद्योगीकरण करो अथवा मरो”

## विभिन्न विश्वविद्यालयों द्वारा मानक उपाधियाँ एवं अनेक सम्मान - भारतरत्न

विश्वेश्वरैया का समस्त जीवन समाज कल्याण की अनेक योजनाओं को कार्य रूप में परिणत करते ही बीता। विश्व विख्यात इंजीनियर और राजनीतिज्ञ होते हुए भी उनमें नम्रता कूट-कूटकर भरी थी। अकर्मण्यता एवं आलस से उन्हें सख्त नफरत थी। उनका कहना था कि हम किसी भी काम को छोटा न समझें और जो भी काम हमें दिया जाए, उसे निष्ठापूर्वक करें। सारे देश की अनेक संस्थाओं ने विश्वेश्वरैया की योग्यता, पुरुषार्थ और अद्भुत संगठन शक्ति के लिए आदर एवं सम्मान प्रकट किया। सन् 1921 में कलकत्ता विश्वविद्यालय ने, सन् 1931 में बम्बई विश्वविद्यालय ने, सन् 1937 में बनारस हिन्दू विश्वविद्यालय ने, सन् 1944 में पटना विश्वविद्यालय ने, सन् 1947 में इलाहाबाद विश्वविद्यालय ने, सन् 1948 में मैसूर विश्वविद्यालय ने, सन् 1953 में आंध्र विश्वविद्यालय ने तथा सन् 1958 में जादवपुर विश्वविद्यालय ने उन्हें डॉक्टर की मानद उपाधियों से अलंकृत किया।

सन् 1911 में ब्रिटिश सरकार ने उन्हें सी.आई.ई. तथा सन् 1915 में के.सी.आई.ई.- सर - की उपाधि से विभूषित किया। सन् 1944 में इंस्टिट्यूशन ऑफ इंजीनियर्स (इंडिया) ने उन्हें ऑनरेरी आजीवन सदस्य चुनकर स्वयं को गौरवान्वित किया। इंस्टिट्यूशन ऑफ इंजीनियर्स (इंडिया) ने उनके सम्मान में एक व्याख्यान माला भी आरंभ की। इसके अन्तर्गत पहला व्याख्यान सन् 1957 में अहमदाबाद में श्री डी.पी. जोगलेकर द्वारा प्रस्तुत किया गया। सर विश्वेश्वरैया इंस्टिट्यूशन ऑफ सिविल इंजीनियर्स, लंदन के भी सदस्य थे। वे इंडियन साइंस कांग्रेस के मानद सदस्य तथा इंस्टिट्यूशन ऑफ टाउन प्लानर्स के मानद फैलो भी रहे। सन् 1923 में लखनऊ में आयोजित दसवीं इंडियन साइंस कांग्रेस के वे अध्यक्ष चुने गए।

7 सितंबर, 1955 को राष्ट्रपति भवन दिल्ली में स्वतंत्र भारत के राष्ट्रपति डॉ. राजेन्द्र प्रसाद ने उन्हें भारत रत्न के सर्वोच्च अलंकरण से सम्मानित किया।

सन् 1958 में बंगाल की रॉयल एशियाटिक सोसायटी द्वारा उन्हें दुर्गा प्रसाद खेतान स्वर्ण पदक से सम्मानित किया गया।

15 सितंबर, 1960 को उनका जन्म शताब्दी समारोह बड़ा धूमधाम से मनाया गया। इस अवसर पर तत्कालीन मैसूर राज्य के मुख्यमंत्री श्री बी.डी. जत्ती ने उनके सम्मान में एक विशेष डाक टिकट जारी किया। इसी दिन बंगलोर के ग्लास हाउस में आयोजित एक अभूतपूर्व एवं भव्य समारोह में देश के कोने- कोने से अनेक महापुरुष एवं स्वतंत्र भारत के प्रथम प्रधानमंत्री श्री जवाहरलाल नेहरू भारत की जनता की ओर से आधुनिक भारत के निर्माता भारतरत्न मोक्षगुण्डम् विश्वेश्वरैया को उनके 100वें जन्मदिवस पर उनका अभिनन्दन करने के लिए एकत्रित हुए। इस अवसर पर प्रधानमंत्री श्री नेहरू ने मैसूर महाराजा श्री जय चामराज वाडियाद के बगल में विराजमान विश्वेश्वरैया को संबोधित करते हुए कहा, “हम आपका किस तरह अभिनन्दन करें। आपका जीवन तो राष्ट्र निर्माण एवं उत्थान के सपनों से भरा हुआ है। आप मानवता की एक विशिष्ट संतान हैं तथा आपके स्वप्न और उनकी सफलता पूरे विश्व के लिए प्रेरणाप्रद है। यदि संसार को उद्वेजन बमों का विनाश लीला से बचाना है तो उसे विश्वेश्वरैया जैसी महान् आत्माओं से विज्ञान को सही दिशा में संचालित करने की शिक्षा लेनी चाहिए।” बड़े सम्मान और पुरुषार्थ के साथ 101 वर्ष की पूर्ण आयु बिताने के उपरान्त 14 अप्रैल, 1962 को उनका स्वर्गवास हुआ।

यह हमारे लिए परम सौभाग्य की बात है कि सर विश्वेश्वरैया जैसा समर्पित और मनीषी व्यक्तित्व, हमारे जीवन काल में, हमारे देश भारत का गौरव बना। इतिहास में शायद ही कोई ऐसा महापुरुष हो जो सर विश्वेश्वरैया के समान एक साथ अन्वेषक, डिजाइनर, कंस्ट्रक्शन इंजीनियर तथा कंसल्टिंग इंजीनियर के साथ-साथ एक दूरदर्शी राजनीतिज्ञ एवं कुशल प्रशासक भी हो। वर्तमान समय में यदि हमें विश्वकर्मा के समकक्ष रखने के लिए किसी एक इंजीनियर को चुनना हो तो निःसंदेह हम विश्वेश्वरैया को ही चुनेंगे। उनके सम्मान में प्रतिवर्ष उनका जन्मदिन 15 सितम्बर अभियन्ता दिवस के रूप में मनाया जाता है।

## विज्ञान समाचार

□ डॉ. दीपक कोहली

### दिमाग की किताब पढ़ लो

किसी के दिमाग में क्या चल रहा है और वह क्या करना चाह रहा है, इसका पता लगाना बेहद मुश्किल है। भले ही व्यक्ति के चाल-चलन और हाव-भाव से कुछ अंदाजा लग जाता है कि दिमाग में कुछ तो चल रहा है। जैसे पुलिस किसी व्यक्ति की सदिग्ध गतिविधियों के आधार पर उसे पकड़ लेती है, लेकिन उसके दिमाग में चल रही योजनाओं का खुलासा करने में कामयाब नहीं हो पाती है। अब ऐसे ही लोगों के दिमाग को आसानी से पढ़ा जा सकता है। वैज्ञानिकों ने ऐसा नायाब तरीका ढूँढ निकाला है, जिससे व्यक्ति के क्रियाकलापों से उसके दिमाग की योजना पता लगाई जा सकती है। न्यूरोसाइंस के शोधकर्ता 'जेसन गेलिवन' ने बताया कि वालंटियरों के दिमाग को तब स्कैन किया गया, जब उनके हाथ तीन तरह की हरकत करते दिखाई दिए। जब वह किसी वस्तु को ऊपर से पकड़ने की कोशिश करे, और उसी वस्तु को नीचे से पकड़ते या उसे छूने की कोशिश करे उन्होंने पाया कि मस्तिष्क के विभिन्न हिस्सों से मिले संकेतों के आधार पर ही वालंटियरों ने एक्शन किए हैं। उन्होंने बताया कि न्यूरोसाइंस की मदद से दिमाग में इलेक्ट्रोड डाले बिना ही दिमाग की योजना तक पहुंचा जा सकता है। इस शोध का आधार यह है कि जब व्यक्ति किसी भी वस्तु को पकड़ने या छूने की कोशिश करता है तो जिस ढंग से वह उसे पकड़ता है, उसी से दिमाग में चल रही किसी बात का पता लगाया जा सकता है।

### कभी धरती के दामन में थे दो चाँद

शोध पत्रिका 'नेचर' में छपे शोध-पत्र की मानें तो कई वर्ष पूर्व पृथ्वी के आसमान पर दो-दो चाँद होते थे। 'यूनिवर्सिटी ऑफ कैलिफोर्निया' के शोधकर्ताओं के अनुसार एक जबरदस्त टक्कर की वजह से दोनों पृथ्वी के चंद्रमा एक हो गए।

अध्ययनकर्ताओं का कहना है कि चंद्रमा का पृथ्वी की ओर वाला हिस्सा अपेक्षाकृत सपाट है। वहीं चंद्रमा के पिछले हिस्से पर पहाड़ों की भरमार है। वहाँ की जमीन का घनत्व भी अपेक्षाकृत ज्यादा है। इससे साबित होता है कि दूसरा चाँद इस तरफ टकराया था और इसके अवशेष इन पहाड़ों के रूप में जमा हो गए।

वैज्ञानिकों के अनुसार चाँद का निर्माण अरबों साल पहले पृथ्वी से मंगल ग्रह के आकार के एक ग्रह के टकराने से हुआ। उस वक्त बहुत बड़ी मात्रा में मलबा पृथ्वी की कक्षा से बाहर निकल गया और बाद में गुरुत्वाकर्षण के कारण एक पिंड के रूप में जमा होने लगा। लेकिन नए सिद्धांत के अनुसार एक और भी चाँद था, जो पृथ्वी की परिक्रमा कर रहा था। इन दोनों चाँद की आपस में टक्कर हुई। हालाँकि यह टक्कर अपेक्षाकृत धीमी गति से हुई। यही वजह है कि क्रेटर बनने या फिर उपग्रहों के वाष्पीकरण होने की बजाय दोनों एक-दूसरे से जुड़ गए। इसकी वजह से चाँद के पिछले हिस्से की मोटाई बढ़ गई।

### कपड़े से दूर होगा वायु प्रदूषण

लगातार बढ़ता प्रदूषण पर्यावरण के लिए किस कदर खतरनाक होता जा रहा है, इससे सभी वाकिफ हैं। प्रदूषण से निपटने के लिए किए जा रहे उपायों के तहत ईको फ्रेंडली चीजों को प्रोत्साहन दिया जा रहा है। इसी दिशा में 'यूनिवर्सिटी ऑफ शेफिल्ड' और 'लंदन कॉलेज' ऑफ फैशन' ने भी संयुक्त रूप से कदम उठाया है। इस टीम के शोधकर्ताओं ने ऐसा कपड़ा बनाया है, जो हवा में मौजूद प्रदूषण के कणों को दूर कर वातावरण को शुद्ध करेगा। टाइटैनियम डाईऑक्साइड युक्त पदार्थ से इसे बनाया गया है। हवा के संपर्क में आने पर यह पदार्थ नाइट्रोजन

□ डॉ. दीपक कोहली, 5/104, विपुल खंड, गोमती नगर, लखनऊ - 226010 (उ. प्र.) फोन: 0522-2303520, 2067117

ऑक्साइड व अन्य दूषित कणों को हटाता है, लेकिन तभी यह काम करता है, जब कपड़ा सूखा हो।

इसे बनाने वालों ने कहा है कि ये तत्व पहले से ही कई पदार्थों में मौजूद थे, बस नई तकनीक का प्रयोग कर उन्होंने यह कपड़ा बनाया है। लंदन कॉलेज ऑफ फैशन की 'हेलेन स्टोरले' ने बताया कि, 'हम इस तकनीक का बिलकुल नए रूप में इस्तेमाल कर रहे हैं। जब इसे पहनकर चलेंगे तो यह हवा को शुद्ध करेगा।'

## कैंसर के इलाज में मदद करेगी भांग के पौधे से बनी दवा

भाग अब कैंसर के इलाज में काम आएगी। वैज्ञानिकों ने एक नए प्रयोग में भांग और गांजे के पौधों से 'सैटिवेक्स' नामक दवा बनाई है, जो कैंसर के इलाज में मदद करेगी। फिलहाल ब्रिटेन के मरीजों पर इसका प्रयोग किया जा रहा है।

## नासा अब गुरु की ओर

मंगल ग्रह के बाद नासा ने अपनी निगाहें सौरमंडल के सबसे बड़े ग्रह गुरु यानी जुपिटर पर टिका दी हैं और उसने एक मानवरहित अंतरिक्ष अभियान शुरू किया है। 'जूनो' नाम का यह अभियान 2016 में गुरु की कक्षा में स्थापित हो जाएगा। अमरीका के केप कानावेराल से अंतरिक्ष में छोड़ा गया यह अभियान पूरी तरह से सौर ऊर्जा से चलेगा। नासा के प्रशासक 'चार्ल्स बोल्डन' ने कहा, "जूनो" को अंतरिक्ष में छोड़ने के साथ नासा ने एक नए क्षितिज की तरफ यात्रा शुरू कर दी है। इस अत्याधुनिक तकनीक से लैस अभियान से हमें अपने सौरमंडल को समझने में और अधिक मदद मिलेगी।"

गुरु ग्रह पर सूरज की रोशनी पृथ्वी पर पहुँचने वाली रोशनी का 1/25वां हिस्सा होती है। तीन पंखों वाले इस यान के पंखों पर 18,000 सोलर सेल लगे हैं। अभियान के प्रमुख 'स्कॉट बोल्डन' के अनुसार ये सौर ऊर्जा से चलने वाला यान है। इसलिए इसके पंख हमेशा सूरज की तरफ ही देखते रहेंगे। 'जूनो' अपने अभियान के दौरान सौरमंडल के

सबसे बड़े ग्रह के चारों तरफ मौजूद गैसों की परतों में झाँककर नए तथ्यों की खोज करेगा। इस अभियान से गुरु के चारों तरफ मौजूद रंगीन पट्टियों के बारे में और अधिक जानकारी मिलने की भी उम्मीद की जा रही है। वैज्ञानिक यह भी जानना चाहते हैं कि इस ग्रह पर पानी किस और कितनी मात्रा में मौजूद है। साथ ही यह भी पता लगाने की कोशिश होगी कि क्या गुरु की सतह पर तरल हाइड्रोजन के समुद्र हिलोरें मार रहे हैं। कई लोग मानते हैं कि तरल हाइड्रोजन का यह समुद्र ही गुरु को उसका शक्तिशाली चुंबकीय आवरण देता है।

## टूटा तो फिर उग जाएगा नया दाँत

ढलती उम्र के साथ दाँत गिरना लाजमी है। कई लोग तो एक्सिडेंट या फिर कीड़ा लगने के कारण अपने दाँत गंवा बैठते हैं, लेकिन अब दोनों ही सूरतों में टेंशन लेने की जरूरत नहीं।

'टोक्यो यूनिवर्सिटी ऑफ साइंस' के वैज्ञानिक स्टेम सेल्स की मदद से लैब में आर्टिफीशियल दाँत उगाने में कामयाब रहे हैं। ये दाँत असली दाँतों जैसे ही दिखते हैं। कीड़ा लगने या चोट खाने की स्थिति में इन्हें दर्द होता है। मजबूती के मामले में भी ये असली दाँतों से पीछे नहीं हैं।

वैज्ञानिकों ने शोध के दौरान चूहों से दो तरह की स्टेम सेल्स लीं। ये दोनों ही दाँतों के निर्माण के लिए जरूरी जेनेटिक सूचनाओं से लैस थीं। लैब में इन स्टेम सेल्स को विटामिन समेत अन्य रसायनों के संपर्क में रखा गया, ताकि इनसे दाँतों की उत्पत्ति सुनिश्चित की जा सके। पांच दिन बाद वैज्ञानिक ने देखा कि स्टेम सेल्स से दाँत की जड़ बनकर तैयार थी। इसे प्लास्टिक के एक छोटे डिब्बे में रखकर, चूहे के शरीर में लगा दिया गया। यहां इसे पूरे दाँत में विकसित होने में 60 दिन का समय लगा।

प्रमुख शोधकर्ता 'मासामित्सु ओशिया' ने बताया कि 'दाँत को चूहे के शरीर के अंदर रखने की बात थोड़ी अजीब लग सकती है। लेकिन चूँकि शरीर में विभिन्न अंगों के विकास के लिए जरूरी तत्व प्राकृतिक रूप से पाए जाते हैं, इसलिए

हमने दाँत को शरीर के अंदर ही उगाने का फैसला किया। छह हफ्ते बाद यह दाँत जबड़े से अच्छी तरह से जुड़ गया।

‘ओशिया’ को उम्मीद है कि नई खोज इंसान के दाँत उगाने में भी मददगार साबित होगी। इन कृत्रिम दाँतों में असली दाँतों के सारे अवयव मौजूद होंगे। फिर चाहे वह इनमल हो, क्राउन हो या फिर रूट। दाँतों को जबड़े और हड्डी से जोड़ने वाले फाइबर भी एक समान होंगे। ये दाँत असली दाँतों जैसे ही दिखेंगे, खाना चबाने में मदद करेंगे, दर्द के प्रति संवेदनशील होंगे एवं इनसे अखरोट भी तोड़े जा सकेंगे।

### संकट में सोन चिरैया

संरक्षणकर्ताओं ने चेतावनी दी है कि दुनिया की सबसे वजनदार पक्षियों में से एक सोन चिरैया की प्रजाति लुप्त होने के कगार पर है। सोन चिरैया लगभग एक मीटर ऊँची होती है और इसका वजन 15 किलो होता है। ‘इंटरनेशनल यूनियन फॉर कंजर्वेशन ऑफ नेचर’ का कहना है कि अब केवल 250 सोन चिरैया ही बची हैं।



आईयूसीएन द्वारा जारी की गई पक्षियों की ‘रेड लिस्ट’ में कहा गया है कि लुप्त होने वाली पक्षियों की तादात अब 1,253 हो गई है, जिसका मतलब है कि पक्षियों की सभी प्रजातियों में से 13 प्रतिशत के लुप्त हो जाने का खतरा है। आईयूसीएन के नवीनतम अंक में विश्व की पक्षियों की प्रजातियों की बदलती संभावनाओं और स्थिति का आकलन किया गया है। आईयूसीएन के वैश्विक प्रजाति योजना के उपनिदेशक ‘जॉ क्रिस्टाफ वार्ड’ ने कहा, ‘एक साल के अंतराल में पक्षियों की 13 प्रजातियां दुर्लभ वर्ग में शामिल हो गई हैं।’ विश्व भर में पक्षियों की 189 प्रजातियों को गंभीर रूप से विलुप्त घोषित किया गया है, जिसमें सोन चिरैया भी शामिल है। सोन चिरैया कभी भारत और पाकिस्तान की घासभूमि में पाई जाती थी, लेकिन अब इसे केवल एकांत भरे क्षेत्रों में देखा जाता है। आखिरी बार राजस्थान को इस पक्षी की गढ़ माना गया था।

### अब नैनो ट्यूब में कैद होगी सौर ऊर्जा

‘मैसाच्युसेट्स इंस्टीट्यूट ऑफ टेक्नोलॉजी’ (एमआईटी) के शोधकर्ता कार्बन से ऐसा नैनो ट्यूब बनाने जा रहे हैं, जिनमें सौर ऊर्जा को संरक्षित किया जा सकेगा। इन्हें चार्ज करना भी आसान होगा। इसके लिए उपयोगकर्ता को इन बैट्रियों को धूप में रखना होगा।

अभी तक सौर ऊर्जा को संरक्षित करने के लिए सिलिकॉन बैटरी का इस्तेमाल किया जाता था। इस तकनीक के इस्तेमाल के लिए बड़े और खुले स्थान की आवश्यकता पड़ती है, लेकिन जल्द ही यह तकनीक बीते दिनों की बात हो जाएगी। वैज्ञानिकों ने कार्बन से नैनो-ट्यूब बनाने के लिए विशेष कण तैयार किए हैं, जो सौर ऊर्जा के ताप और रसायन को संरक्षित कर लेंगे। इसमें ऊर्जा को लंबे समय तक संरक्षित रखा जा सकता है। वैज्ञानिकों का कहना है कि जब भी ऊर्जा की आवश्यकता होगी, ट्यूब के तापमान में हल्का सा बदलाव लाया जाएगा।

## लाई डिटेक्शन मशीन

□ डॉ. जे. एल. अग्रवाल

लम्बे समय से ज्ञात है कि झूठ बोलते समय शरीर में कुछ परिवर्तन होते हैं, जिनसे अपराधी के बारे में पता लगाने के प्रयास होते रहे हैं। अफ्रीका में संभावित अपराधी को चिड़िया के अंडे दिए जाते थे, जिसका अंडा टूट जाता था, उसको अपराधी मान लिया जाता था। एक बार अकबर ने बीरबल से चोर पकड़ने के लिए कहा। बीरबल ने सभी संभावित व्यक्तियों को एक-एक छड़ी दी और कहा कि जिसने चोरी की होगी, उसकी छड़ी रात में एक बालिस्त लम्बी हो जाएगी। असली चोर ने छड़ी लम्बी होने के भय से रात को छड़ी काट दी। सुबह उसकी छड़ी छोटी मिली, फिर उसने अपराध कबूल कर लिया। झूठ बोलने में सोचना पड़ता है तथा तनाव हो सकता है, जिसके कारण शारीरिक बदलाव होते हैं। आधुनिक युग में सच और झूठ का पता लगाने के लिए लाई डिटेक्शन मशीन ( पॉली ग्राफ ) का प्रयोग किया जाता है। इसका उपयोग पुलिस, सी.बी.आई. अपराधियों की जाँच तथा उनसे अपराध कबूल करवाने के लिए करती है। विदेशों में कुछ संवेदनशील, महत्वपूर्ण नौकरी से पूर्व पॉलीग्राफ जाँच की जाती है, जिससे उनकी सत्य निष्ठा की परख हो सके।

शरीर की जिन प्रक्रियाओं को हम स्वैच्छिक रूप से नियंत्रित नहीं कर सकते, जैसे हृदय, श्वसन गति, रक्तचाप, त्वचा की संवाहकता, मस्तिष्क की विद्युत तरंगें (ई.ई.जी.) इत्यादि के रिकार्ड को पॉलीग्राफ कहते हैं। सच बोलने में इनमें विशेष बदलाव नहीं होते, जबकि झूठ बोलने पर घबराहट, डर, तनाव, सोच-विचार करने के कारण इनमें बदलाव होते हैं। इन परिवर्तन का विश्लेषण कर झूठ-सच का पर्दाफाश हो सकता है।

यद्यपि यह पूर्णतः विश्वसनीय विधि नहीं मानी जाती है, इसके अनेक आलोचक हैं तथा अनेक न्यायालय भी पॉलीग्राफ टेस्ट से प्राप्त विवरण को साक्ष्य नहीं मानते, परन्तु इसका उपयोग अपराध को कबूल करवाने, जाँच आगे बढ़ाने और साक्ष्य इकट्ठा करने में व्यापक रूप से होता है। कठोर अपराधी की पॉलीग्राफ टेस्ट या नारको टेस्ट करवाने के लिए पुलिस, सी.बी.आई., ए.टी.एस. को न्यायालय से अनुमति लेनी होती है। नारको टेस्ट की खबरें अक्सर समाचार में आती रहती हैं।

झूठ का पता लगाने के लिए अनेक विधियाँ विकसित की गई हैं, जैसे पॉलीग्राफ, काग्नेटिव पॉलीग्राफ, फंक्शनल एम. आर.आई., कान्टेक्ट, ब्रेनफिंगर प्रिंटिंग इत्यादि। ऐसी दवाएँ जिनके देने के पश्चात व्यक्ति मानसिक स्थिति को नियंत्रित नहीं कर पाते, मोहित-सी अवस्था में रहते हैं, उस समय पॉलीग्राफ टेस्ट या मस्तिष्क की विद्युत तरंगों की पी-300 जाँच नारको टेस्ट कहलाती है। दवाएँ जैसे सोडियम थायोपेन्टाल को सच्चाई का पता लगाने के प्रयोग किया जाता है। इसका इन्जेक्शन देने के बाद व्यक्ति अर्धमूर्च्छित सी अवस्था में रहता है और झूठ नहीं बोल पाता। यह दवाएँ टूथ सीरम भी कहलाती हैं। इन दवाओं का इन्जेक्शन लगने पर भी व्यक्ति सत्य और कल्पना को मिला कर प्रश्नों को उत्तर दे सकते हैं। यदि बार-बार दोहराते हैं, अपने को मन ही मन गलत बात को सही ठहराते हैं, तो उनमें बदलाव नहीं होते हैं।

### पॉलीग्राफ टेस्ट करने की विधि

टेस्ट करने के पूर्व न्यायालय की लिखित अनुमति और व्यक्ति की सहमति आवश्यक है। टेस्ट के पूर्व प्रारम्भिक

□ डॉ. जे. एल. अग्रवाल, प्रो. एवं विभागाध्यक्ष, फिजियोलोजी, एस. आई. एम. एस., हापुड़  
निवास: 3, ज्ञानलोक, मयूर विहार शास्त्री नगर, मेरठ - 250004 (उ. प्र.)



इन्टरव्यू लिया जाता है, जिससे उसके संबंध में मूल जानकारी प्राप्त होती है, जिनका कंट्रोल प्रश्नों में इस्तेमाल किया जाता है। फिर जांचकर्ता टेस्ट की प्रक्रिया समझाते हैं, साथ ही यह भी बताया जाता है कि टेस्ट उनके सच-झूठ का पता लगता है, अतः प्रश्नों का उत्तर सही-सही दें। नारको एनालिसिस के लिए उनको सोडियम पेटोथॉल के इन्जेक्शन दिए जाते हैं, इसकी मात्रा, आयु, लिंग, स्वास्थ्य के अनुसार निर्धारित की जाती है। सामान्यतः व्यस्क, स्वस्थ व्यक्ति में 3 ग्राम दवा को 300 मि. ली. सलाइन में घोल कर धीरे-धीरे शिराओं के द्वारा दिया जाता है। दवा के प्रभाव से मस्तिष्क का नियन्त्रण ढीला हो जाता है, व्यक्ति मोहित जैसी अवस्था में हो जाते हैं, झूठ नहीं बोल पाते। टेस्ट के लिए इनके शरीर में विभिन्न ट्रॉसडूयसर लगाए जाते हैं जिससे वांछित मापदण्ड कम्प्यूटर पर रिकार्ड होते हैं।

पहले उनसे कंट्रोल प्रश्न पूछे जाते हैं जैसे नाम, पिता का नाम, जन्मतिथि, शिक्षा इत्यादि जिससे इनके सामान्य स्तर का पता लग सके फिर कुछ प्रश्न ऐसे पूछे जाते हैं जिनका अधिकांश सही उत्तर नहीं देते, जिससे झूठ-सच में होने वाले बदलाव का उस व्यक्ति में पता लग जाए। फिर सार्थक जानकारी प्राप्त करने के लिए प्रश्नों को विभिन्न रूप में पूछ कर उनके उत्तर देते समय होने वाले बदलाव को रिकार्ड किया जाता है। प्रश्न करते समय और बाद में विश्लेषण कर झूठ-सच का पता लग सकता है। टेस्ट के पश्चात पुनः टेस्ट के दौरान कथनों की पुष्टि की जाती है। टेस्ट के दौरान फारेन्सिक विशेषज्ञ, मनोचिकित्सक, मूर्च्छाचिकित्सक की उपस्थिति अनिवार्य है। टेस्ट के लिए सही प्रश्न और उनका सही ढंग से पूछना अति महत्वपूर्ण है।

## पी-300 टेस्ट

जब व्यक्ति किसी जानी/पहचानी आवाज को सुनता है, फोटो/दृश्य को देखता है तो उसकी मस्तिष्क की विद्युत तरंगों (ई.ई.जी.) में विशिष्ट तरंग पी. 300 उत्पन्न होती हैं। इस टेस्ट में व्यक्ति को कम्प्यूटर मॉनीटर के सामने बैठा कर कुछ आवाजें सुनायी तथा दृश्य/फोटो दिखाए जाते हैं, साथ ही ई.ई.जी. रिकार्ड किया जाता है, जानी-पहचानी

आवाज दृश्यों के कारण पी. 300 तरंगें उत्पन्न होती हैं, जिससे उनके सच-झूठ को पकड़ा जा सकता है।

## लाई डिटेक्शन टेस्ट के उपयोग

- अपराधियों से जुर्म कबूल करवाने के लिए न्यायालय की अनुमति प्राप्त करने के बाद।
- जांच को बढ़ाने, साक्ष्य इकट्ठा करने के लिए।
- कुछ संवेदशील नौकरी जैसे जासूस, पुलिस, सेना इत्यादि में पॉलीग्राफ टेस्ट, कर उनकी विश्वसनीयता, सत्यनिष्ठा सिद्ध करने के लिए। सन् 2008 से अमेरिका की डिफेंस इन्टेलिजेंस एजेंसी ने अपने सभी अधिकारियों, कर्मचारियों के लिए हर वर्ष पॉलीग्राफ टेस्ट अनिवार्य कर दिया है।
- यौन अपराधियों को छोड़ने से पूर्व उनकी पॉलीग्राफ जांच कई देशों में अनिवार्य हो गयी है, जिससे उनके सुधरे आचरण की पुष्टि हो सके।
- इसके उपयोग से, जांचों की पुष्टि की जा सकती है और प्राप्त सूत्रों से नए साक्ष्य ढूढने में मदद मिल सकती है।
- अनेक टी. वी. कार्यक्रमों में भी लाईडिटेक्शन के कार्यक्रम प्रसारित होते हैं।

## लाई डिटेक्शन टेस्ट और कानून

इन जांचों की प्रमाणिकता और वैधता, हर देश में भिन्न-भिन्न है। अर्धमूर्च्छित, अचेतन व्यक्ति द्वारा नारकोटेस्ट के दौरान अपराध स्वीकृति को अधिकांश न्यायालय पूर्ण रूप से साक्ष्य नहीं मानते। कोर्ट, वकील, न्यायाधीश के बीच इन टेस्टों के निर्विवाद रूप से सही होने पर मतभेद हैं। कुछ व्यक्ति अपराधी होने पर भी इन टेस्ट में पास हो सकते हैं, जबकि निरपराधी फेल। अपने गलत कार्य को सही समझने पर यह झूठ को सही मान सकते हैं और यह टेस्ट पास हो सकते हैं। परन्तु इस जांच के परिणाम से जांचकर्ता को अन्य साक्ष्य इकट्ठा करने में मदद मिलती है। भारत में इसको साक्ष्य मानना न्यायाधीश के विवेक पर निर्भर होता



है। सुप्रीम कोर्ट ने 17 मार्च 2010 में अति महत्वपूर्ण निर्णय दिया जिसमें अन्य साक्ष्यों के साथ नारकोटेस्ट को साक्ष्य मानकर अजय कुमार पाल, जिसने एक ही परिवार के पांच लोगों की हत्या की थी को मृत्युदंड की सजा दी।

### लाई डिटेक्शन टेस्ट की प्रमाणिकता

मनोचिकित्सक पॉलीग्राफ, नारकोटेस्ट की प्रमाणिकता पर शक करते हैं। सर्वेक्षणों, शोधों से ज्ञात हुआ है कि टेस्ट दुबारा सच उगलवाने की क्षमता करीब 61 प्रतिशत होती है। कुछ व्यक्ति सच बोलने के बावजूद भी पॉलीग्राफ टेस्ट में फेल हो जाते हैं, तो निरपराध को सजा मिलना अन्याय होगा।

अनेक अपराधी, जासूस, डबल एजेंट पॉलीग्राफ टेस्ट पास करने में सफल हुए हैं, जबकि कुछ पॉलीग्राफ टेस्ट में फेल होने पर गिरफ्तार हुए, और उन्हें सजा हुई।

पॉलीग्राफ टेस्ट को झूठलाने के लिए भी अनेक तरीके खोजे गए हैं। एक ओर इन्टरनेट पर पॉलीग्राफ टेस्ट झूठलाने

के अनेक ढंग बताए गए हैं जैसे-शांत रहें, आराम करें, जांचकर्ता से मधुर संबंध बनाए, सहयोग दें, प्रश्न का उत्तर देते समय सावधानी पूर्वक श्वास नियन्त्रित करें। दूसरी ओर कन्ट्रोल प्रश्न के दौरान यदि खतरे वाली स्थिति के उत्तेजनात्मक विचार मन में लाएँ या किसी नुकली वस्तु को चुभाएँ हैं, तो उनकी हृदय, श्वसन गति इत्यादि में बदलाव होते हैं, ये बदलाव झूठ बोलने पर भी होते हैं। इस स्थिति में जांचकर्ता के लिए सच-झूठ में फर्क करना कठिन हो जाता है।

वर्तमान समय में सच-झूठ का पता लगाने के लिए अन्य विधियों की खोज हो रही है। आशा है भविष्य में लाईडिटेक्शन की विधि पूर्णतः विश्वसनीय हो जाने की सम्भावना है। अपराधी की पहचान आसानी से हो सकेगी। पॉलीग्राफ, नारकोटेस्ट से सच-झूठ का पता लग सकता है, महत्वपूर्ण सुराग मिल सकते हैं, जिनसे अन्य साक्ष्य प्राप्त हो सकते हैं, अपराधी को सजा मिल सकती है।



## विद्यार्थी जीवन में नैतिक शिक्षा की आवश्यकता

□ तरुण पुनिया

विद्यार्थी जीवन मनुष्य का सर्वाधिक महत्वपूर्ण समय है, इसका उतना ही महत्व है जितना एक विशाल सुन्दर भवन के लिए पक्की मजबूत नींव का। विद्या की चाह रखने वाला, विद्या से प्रेम रखने वाला ही विद्यार्थी है जिसके जीवन का लक्ष्य शिक्षा प्राप्त करना है, ज्ञान प्राप्त करना है। प्रश्न उठता है कि विद्या क्या है? शिक्षा क्या है? क्या केवल पाठ्य पुस्तकों का पढ़ना ही शिक्षा है? क्या केवल परीक्षा में अच्छे अंक प्राप्त करना ही शिक्षा है? आखिर शिक्षा किसलिए ग्रहण की जाए?

शिक्षा का वास्तविक उद्देश्य है मनुष्य को अपने वास्तविक रूप को जानना ताकि वह अन्य प्राणियों से अपने को अलग कर सके। जैसा कि भारतीय विचारक भर्तृहरि का मानना है कि ऐसा व्यक्ति जिसके पास न विद्या है, न तप है, न ही दान करता है, न ही ज्ञान है, न ही शील है, न ही किसी प्रकार का गुण है और न ही नैतिक जीवन का पालन करता है वह इस पृथ्वी पर मनुष्य के रूप में पशुतुल्य विचरण करता रहता है—

“येषां न विद्या न तपो न दानम्  
ज्ञानं न शीलं न गुणो न धर्मः।  
ते मर्त्यलोके भुवि भारभूता  
मनुष्य रूपेण मृगाश्चरन्ति॥”

शिक्षा का उद्देश्य मनुष्य को एक स्वतंत्र चिन्तनशील प्राणी के रूप में पहचान दिलाना। चिन्तन की दिशा भी ऐसी होनी चाहिए जहाँ सृजनात्मक ऊर्जा का प्रवाह हो। ज्ञान अपने आप में तब तक महत्व नहीं रखता जब तक उसका एक नैतिक उद्देश्य न हो। साथ ही ऐसी नैतिकता जो व्यावहारिक हो।

चूँकि बालक का मन एक कोरे कागज की तरह होता है जिस पर काले धब्बे भी उतने ही असरदार दिखाई देते हैं

जिसते कि सुन्दर अक्षर। तो क्यों न हम इस बाल मन की परत पर सृजनात्मक अक्षरों के माध्यम से एक उत्तम व्यक्ति का निर्माण करें। अगर विद्यार्थी जीवन में हम नैतिक शिक्षा का अवलम्बन लेते हैं तो सकारात्मक बौद्धिकता से युक्त समाज का निर्माण कर सकते हैं जो कि वास्तव में शिक्षा का ही नहीं, बल्कि मानव जीवन का भी अंतिम उद्देश्य है। यही कारण था कि गांधी जी ने एक नई शिक्षा व्यवस्था का पुरजोर समर्थन किया था, जिसमें नैतिक शिक्षा को प्राथमिकता दी थी।

शिक्षा का उद्देश्य है मनुष्य को मनुष्य बनाना, सच्चे अर्थों में मानव बनाना। मनुष्य कैसे बनाया जा सकता है? इसके लिए आवश्यकता है नैतिक शिक्षा की अथवा आचरण शिक्षा की, जिससे मनुष्य स्वार्थ से परमार्थ की ओर जाता है, और परिवार, समाज, राष्ट्र तथा विश्व के लिए उपयोगी बनता है। मनुष्य की मनुष्यता का प्रमाण उसका चरित्र होता है। चरित्रहीन मनुष्य तो पशु के समान है। पाशविक वृत्ति वाले मनुष्य से सभ्य समाज नहीं बनता है।

विद्यार्थी जीवन में अन्य विषयों की शिक्षा के साथ – साथ नैतिक शिक्षा की नितांत आवश्यकता है। आज जितनी भी समस्याएं वैश्विक समाज की जड़ें खोखली कर रही हैं उनका मूल अगर खोजा जाए तो उनमें से एक नैतिक शिक्षा का शिक्षा प्रणाली में अभाव है।

आज मनुष्य सिर्फ और सिर्फ नैतिकता के अभाव में, लगाम रहित पशु की तरह लक्ष्य विहीन अंधी दौड़ में शामिल हो रहा है जो केवल और केवल अपने को ही देखता है, अपना सुख, अपना हित, अपनी इच्छाओं की पूर्ति में ही लगा हुआ है। निर्बलों का शोषण कर रहा है, असत्य का सहारा लेकर दूसरों को भ्रमित कर अपना काम निकालने में ही जुटा हुआ है। कोई भी अमानवीय कृत्य करने में उसे संकोच, शर्म और डर नहीं है। नित नए अनैतिक कृत्यों से

□ तरुण पुनिया, शैक्षिक अधिकारी (भूगोल), रा. मु. वि. शि. सं., नोएडा

अखबारों की सुर्खियाँ भरी रहती हैं। आखिर ऐसा क्यों है जबकि शिक्षा का प्रसार दिन प्रतिदिन बढ़ रहा है। आज डिग्रीधारी शिक्षित व्यक्तियों की संख्या अधिक है परन्तु जितने ज्यादा शिक्षित हो रहे हैं, उतनी ही अधिक समस्याएं उत्पन्न होकर राष्ट्र का सिरदर्द बन रही हैं। विद्वान व्यक्ति यदि चरित्रवान नहीं है तो वह मणिधारी सांप की तरह है, उससे दूर ही रहना चाहिए। उसकी मणि उसका विष शान्त नहीं करती। इसके विपरीत विद्वान और चरित्रवान सर्वत्र आदर प्राप्त करता है। सदाचारी व्यक्ति के पास सद्गुण उसी प्रकार इकट्ठे हो जाते हैं जिस प्रकार सभी नदियां इकट्ठी होकर समुद्र की ओर चलती हैं।

चरित्र निर्माण का कार्य ऐसा नहीं है, जो कुछ घण्टों या दिनों में हो जाए। इसके लिए बचपन से ही प्रयत्न करना पड़ता है। विद्यार्थी जीवन मनुष्य का आरम्भिक जीवन है। अतः नैतिक शिक्षा का कार्य पहली कक्षा से ही प्रारम्भ होना चाहिए। यदि लोग चरित्रवान नहीं होंगे तो सोने-चांदी के अम्बार भी राष्ट्र को बचा नहीं पाएंगे। दृढ़प्रतिज्ञ, परिश्रमी, साहसी, सत्यनिष्ठ एवं शिष्ट विद्यार्थी ही राष्ट्र का भविष्य उज्ज्वल कर सकते हैं।

नैतिक गुणों से सम्पन्न व्यक्ति को समाज में सम्मान, यश मिलता है और उसे धन आदि सभी सांसारिक सुख प्राप्त होते हैं। धर्म, अर्थ, काम और मोक्ष चारों पदार्थ उसको सुलभ होते हैं। जीवन में शिक्षा का महत्व तो सर्वविदित है इसीलिए हमारी प्राचीन भारतीय परम्परा में जीवन के आरम्भिक 25 वर्ष, जिसे ब्रह्मचर्याश्रम का नाम दिया गया था, शिक्षा प्राप्त करने के लिए नियत किया गया था परन्तु ज्ञान की शोभा तभी है जब वह नैतिक शिक्षा से युक्त हो। प्रश्न है कि हमें विद्यार्थियों में किन नैतिक मूल्यों को प्रदान करना चाहिये:

तैत्तिरीय उपनिषद् में कुछ नैतिक मूल्यों की चर्चा की गई है जिन्हें हमें अपनाना चाहिए। इनमें सत्यनिष्ठा और धार्मिकता

प्रमुख है। उदाहरण के लिये कुछ और मूल्य भी आवश्यक हैं, जैसे:

सत्यं वद। धर्मं चर।

सत्यान्न प्रमदितव्यम्। धर्मान्न प्रमदितव्यम्।

मातृदेवो भव। पितृदेवो भव। आचार्यदेवो भव।

अतिथिदेवो भव।

यान्यनवद्यानि कर्माणि। तानि सेवितव्यानि। नो इतराणि।

एष आदेशः। एष उपदेशः। एतदनुशासनम्।

सत्य बोलो; निर्धारित आचरण का पालन करो।

सच से कभी मुँह मत मोड़ो।

अपने कर्तव्य पथ पर अडिग रहो।

अपने माता-पिता, गुरु और अतिथि का ईश्वर तुल्य सम्मान करो।

अच्छे कर्म करो।

निन्दनीय कर्म से परहेज करो।

यही आदेश है। यही शिक्षा है,

जीवन में इसका पालन करते हुए आगे बढ़ो।

नैतिक शिक्षा को प्रदान करने के लिये, यह उचित होगा कि उसे वर्तमान पाठ्यक्रम में समाहित कर दिया जाय।

नैतिक शिक्षा समाहित पाठ्यक्रम पढ़ने के बाद आशा की जाती है कि विद्यार्थी में नैतिक मूल्यों का विस्तार होगा।

यदि देश का विद्यार्थी नैतिक मूल्यों से परिपूरित होगा, तो उस देश का विकास कोई नहीं रोक पाएगा।

## हिन्दी भाषा समर्थ होते हुए भी असमर्थ क्यों

□ डॉ. नरेश कुमार

किसी भी भाषा की समृद्धि उसकी शब्द-सम्पदा, भाषा के मानकीकरण, साहित्य की विभिन्न विधाओं में सृजन की निरन्तरता तथा उस भाषा के साहित्य के प्रामाणिक इतिहास-लेखन से होती है। जहाँ तक हिन्दी भाषा के शब्द-सम्पदा के संकलन तथा उनके सन्दर्भगत अर्थों का व्युत्पत्तिमूलक स्पष्टीकरण का प्रश्न है, इस दिशा में महत्वपूर्ण कार्य नागरी प्रचारिणी सभा, काशी के तत्त्वाधान में 'हिन्दी-शब्द-सागर' के माध्यम से किया गया और कालोपरान्त आचार्य रामचन्द्र वर्मा ने कोश-सम्पादन के माध्यम से यह महत्वपूर्ण कार्य आगे बढ़ाया। चूँकि हिन्दी में आज विभिन्न विषयों के नए शब्द आ रहे हैं, अतः शब्द-संकलन और उनके व्युत्पत्तिमूलक अर्थ-उद्घाटन की दिशा में 'हिन्दी व्युत्पत्ति कोश', 'हिन्दी-हिन्दी कोश', 'बाल हिन्दी कोश' आदि का सम्पादन किया।

'पारिभाषिक शब्दावली' की दिशा में सन् 1950 के लगभग डॉ. रघुवीर का परिश्रमसाध्य प्रयास था, किन्तु उनके द्वारा दिये गए पारिभाषिक शब्द कठिन होने के कारण प्रचलित नहीं हो सके। तकनीकी वैज्ञानिक शब्दावली आयोग ने विभिन्न विषयों के पारिभाषिक शब्दकोश तैयार कराये, जिन्हें विश्वविद्यालय एवं स्कूल की पुस्तकों में शामिल किया जा रहा है।

हिन्दी-साहित्य के इतिहास की बात लीजिए। इस दिशा में आचार्य रामचन्द्र शुक्ल, श्यामसुन्दरदास, डॉ. लक्ष्मी सागर वाष्णीय, नन्द दुलारे वाजपेयी और डॉ. नगेन्द्र का प्रयास प्रशंसनीय रहा। नागरी प्रचारिणी सभा काशी द्वारा प्रकाशित 'हिन्दी साहित्य का वृहत् इतिहास' भी उल्लेखनीय है, किन्तु आधुनिक काल में हिन्दी-साहित्य की विभिन्न विधाओं में निरन्तर सृजन किया जा रहा है, अतः आधुनिक

काल के साहित्यकारों के योगदान का समीक्षात्मक उल्लेख हिन्दी-साहित्य के इतिहास में आपेक्षित है। वस्तुतः आधुनिक काल के लेखकों द्वारा किये गए अद्यतन योगदान का लेखा-जोखा तैयार करना उचित होगा ताकि हिन्दी साहित्य के इतिहास का प्रामाणिक अध्ययन प्रस्तुत किया जा सके।

हिन्दी एक समृद्ध, समर्थ एवं व्याकरण सम्मत भाषा है, किन्तु मुगलों के शासन काल में उर्दू, अरबी, फारसी का बोलबाला रहा। यद्यपि मुगलों के शासन काल में शासन-कार्य का माध्यम हिन्दी भी थी, तथापि मुगलों के शासन में हिन्दी के मिले-जुले प्रयोग की बात स्पष्ट होती है। औरंगजेब के समय के निम्नलिखित फरमान से यह बात परिलक्षित होती है—“स्वस्ति श्री संवत् 1825 माघ सूदि 7 गुरौ अहोय पातशाहा श्री सुलतान आलमग्यरी साहिब कुराननशीन धारमिक सत्यवादी वाचा अविचल ज्यवन कुल तिलक। सकलरायां शरोमणि महाराज राजेश्वर सब ए हवो पातशाह श्री श्री श्री श्री श्री अवरंगजेब सूरब मुद्रा राज्यं करोति तस्यादेशात् श्री गुजरात सी श्री राजनगरे सो वे साहिबु नु वाप श्री मह वतजान दो वार्ता श्री श्री हाजी भट्टिभद् सफि छि।.....” मुगलों के शासन के उपरान्त यद्यपि ईस्ट इण्डिया कम्पनी के शासन काल में हिन्दी का प्रयोग जारी रहा, किन्तु लार्ड मैकाले ने राजकाज की भाषा के रूप में अंग्रेजी भाषा का प्रयोग किया और शिक्षा के माध्यम में अंग्रेजी को प्राथमिकता दी गई। यद्यपि उत्तर प्रदेश, बिहार और मध्य प्रदेश में अंग्रेजी के साथ-साथ उर्दू को कचहरियों के कामकाज की भाषा बनाया गया। स्वतंत्रता-प्राप्ति के पश्चात् हिन्दी को केन्द्र सरकार की राजभाषा बनाया गया। 14 सितंबर, 1949 भारत की संविधान सभा में हिन्दी को राजभाषा के रूप में स्वीकार किया। इसीलिये 14 सितंबर को हम 'हिन्दी

□ डॉ. नरेश कुमार, जे-235 पटेलनगर प्रथम, गाजियाबाद, उत्तर प्रदेश

दिवस' के रूप में मनाते हैं और राजभाषा के रूप में सम्मानित करते हैं। यद्यपि घोषित रूप में हिन्दी भले ही 'राजभाषा' का दर्जा दिया गया हो, किन्तु इसका व्यावहारिक पथ बहुत सन्तोषजनक नहीं रहा है। प्रारम्भ में भारतीय संविधान में 15 भारतीय भाषाओं को मान्यता दी गई, जिनमें हिन्दी भी एक भाषा है। बाद में अष्टम् सूची और भाषाएँ जोड़ी गईं और अब हिन्दी के साथ 22 अन्य भारतीय भाषाएँ भी इस श्रेणी में सम्मिलित हैं, किन्तु राजस्थानी, बुन्देली, भोजपुरी और मगही को भी आठवीं सूची में शामिल करने की मांग राज्य सभा में 23 दिसम्बर 2003 को की गई। वस्तुतः बोलियों को आठवीं सूची में सम्मिलित करने से पूर्व यह देखना चाहिए कि राजभाषा हिन्दी की अहमियत कम न हो। भाषा और बोली के बीच का फर्क ध्यान में रखना आवश्यक है। आज उच्चतम न्यायालय और प्रत्येक उच्च न्यायालय में सभी कार्यवाहियाँ अंग्रेजी भाषा में होती हैं। यदि कोई निर्णय, डिक्री या आदेश अंग्रेजी से भिन्न किसी भाषा में दिया या पारित किया जाता है तो उच्च न्यायालय के प्रधिकार से अंग्रेजी भाषा में उसका अनुवाद किया जाएगा। अब तक उत्तर प्रदेश, मध्य प्रदेश, राजस्थान और बिहार के राज्यपालों ने अपने उच्च न्यायालयों में उपर्युक्त उद्देश्यों के लिए माननीय राष्ट्रपति से हिन्दी में प्रयोग की अनुमति ली है। संसद में सदन के समझ रखे गये प्रशासनिक तथा अन्य प्रतिवेदन और राजकीय कागज-पत्र हिन्दी और अंग्रेजी दोनों भाषाओं में देना अनिवार्य है। राज्यों के बीच पत्राचार की स्थिति यह है कि केन्द्रीय सरकार और हिन्दी को राजभाषा के रूप में न अपनाने वाले किसी राज्य के बीच पत्रव्यवहार अंग्रेजी में होगा। इसी प्रकार हिन्दी भाषी राज्यों की सरकारें भी ऐसे गैर हिन्दी भाषी राज्यों की सरकारों के साथ अंग्रेजी में पत्राचार करेंगी और यदि वे ऐसे राज्यों को कोई पत्र हिन्दी में भेजती हैं तो साथ में उसका अंग्रेजी अनुवाद भी भेजेंगी।

पारस्परिक समझौते से ही दो या अधिक राज्य आपसी पत्राचार में हिन्दी का प्रयोग कर सकते हैं। केन्द्रीय सरकार के किसी एक मंत्रालय या विभाग और किसी दूसरे मंत्रालय या विभाग के बीच पत्रव्यवहार हिन्दी या अंग्रेजी में हो सकता है। उपर्युक्त तथ्य आज हिन्दी भाषा की संवैधानिक एवं व्यावहारिक स्थिति को दर्शाते हैं।

शब्दावली की प्रचुरता एवं निश्चित अर्थों की अभिव्यक्ति की दृष्टि से हिन्दी एक समर्थ भाषा है, किन्तु हिन्दी भाषा में अपने विचार प्रस्तुत न करना अथवा अंग्रेजी में बोलकर अपने को बड़ा व्यक्ति समझना हमारी मानसिकता को दिखाता है। आधुनिक तकनीकी की दृष्टि से भी अब हिन्दी असमर्थ एवं पिछड़ी हुई नहीं है। कम्प्यूटर के माध्यम से हिन्दी की तकनीकी का विकास हो रहा है।

हिन्दी को समर्थ बनाने और इसके विकास के लिए अन्तर्राष्ट्रीय वांग्मय को हिन्दी अनुवाद के माध्यम से उपलब्ध कराना आज समय की मांग है। फिलहाल वैज्ञानिक साहित्य के हिन्दी में अनुवाद की स्थिति सन्तोषजनक नहीं है। पारिभाषिक शब्दावली में परिवर्द्धन-कार्य निरन्तर चलते रहना अपेक्षित है और पारिभाषिक शब्दावली का पुनर्निरीक्षण भी समय-समय पर किया जाना चाहिए।

कार्यालयों में हिन्दी के प्रयोग को बढ़ाकर तथा बोल चाल में हिन्दी का प्रयोग करके हिन्दी का सम्मान बढ़ाया जा सकता है। इस संदर्भ में निम्न पंक्तियों को उद्धृत करना उपयुक्त रहेगा:

“कोटि-कोटि कंठों की भाषा

जन-गण की मुखरित अभिलाषा।

हिन्दी है पहचान हमारी,

हिन्दी हम सबकी परिभाषा।”



## Geothermal Energy: A Natural Source of Energy

□ Dr. Oum Prakash Sharma

□ Ms. Poonam Trikha

Presently, most of our energy demand is met by the energy obtained from conventional fossil fuels such as coal, petrol, diesel, natural gas, and kerosene oil etc. It is estimated that we could run out of oil in about 40 years and out of natural gas soon after that. Not only are we running out of fossil fuels, but they are adding to our environmental problems by releasing harmful byproducts that increase pollution and contribute to global warming. In view of the limited storage of fossil fuels and ever increasing gap between demand and supply of energy, it is necessary to switch over to the new and renewable sources of energy. It is a fact that India has one of the highest potentials for the effective use of renewable energy. During the last one decade, there has been a visible impact of renewable energy in the Indian energy scenario. Apart from contributing about 12.5% in the national electric installed capacity, renewable energy based applications have benefitted millions of people in Indian villages by energy needs in an environment friendly manner. India is the world's fifth largest producer of wind power besides Denmark, Germany, Spain, and USA. Other renewable energy technologies, including solar photovoltaic, solar thermal, small hydro power, geothermal, sea wave and biomass energy are also spreading. As greater reliance on renewable energy sources offers enormous economic, social, and environmental benefits, we need to explore more sources of renewable energy.

Geothermal energy is one of the renewable sources of energy available in the form of the vast natural reservoir of heat energy in the earth's interior. A number of geothermal power plants are operational in at least 24 countries of the world which are generating more than 10,000 MW power. Besides it, geothermal energy is being used directly for heating in at least 78 countries. The largest producer of this energy is USA that generates about 3,086 MW of electricity.

### What is Geo Thermal Energy?

Geothermal energy is one of the potential alternative sources of energy which has been successfully catering to both industrial and domestic energy requirements in many parts of the world over last few decades. **Geothermal** is made of two Greek words – *geo* which means “earth,” and *therme*, means “heat”. Thus, geothermal energy is the heat from the Earth. It is clean and sustainable source of energy. Resources of geothermal energy range from moderate –to-low temperature hot spring systems to hot rock found a few miles beneath the Earth's surface, and down even deeper to extremely high temperatures of molten rocks. Below the Earth's crust, there is a layer of hot and molten rocks called magma. Heat is continually produced there, mostly due to decay of naturally radioactive materials such as uranium and potassium. Heat flows outward from its interior. Normally, the crust of the Earth

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□ Dr. Oum Prakash Sharma, Deputy Director, National Centre for Innovations in Distance Education, Indira Gandhi National Open University, Maidan Garhi- 110068, opsharma@ignou.ac.in

□ Ms. Poonam Trikha, Consultant, National Centre for Innovations in Distance Education, Indira Gandhi National Open University, Maidan Garhi- 110068, poonamtrikha@ignou.ac.in

insulates us from Earth's interior heat. The mantle is semi-molten, the outer core is liquid and the inner core is solid. It is interesting to mention here that the amount of heat within 10,000 meters of Earth's surface contains 50,000 times more energy than all the oil and natural gas energy resources in the world.

In fact, geothermal energy is one of the oldest types of natural sources of heat. It dates back to Roman times, when the heat from the Earth was used instead of fire, to heat rooms and/or warm water for baths. Presently, it is being used as a source for producing electricity, mainly in regions of tectonic plate movement.

### How Geothermal Energy Is Captured?

Now, the basic question is how do we get geothermal energy for useful purposes? Normally the geothermal energy is captured from geothermal hotspots. Basically, a hotspot is an area of reduced thickness in the mantle which allows the excess internal heat from the interior of the earth to the outer crust. These hotspots include the volcanic islands, the mineral deposits and geysers normally known as hot springs. Following are few ways in which heat from these geothermal hotspots is obtained.

#### 1. *Hot Springs for Geothermal Power Plants:*

The most common way of capturing energy from geothermal heat is to tap into naturally occurring "hydrothermal convection" systems where cooler water seeps into Earth's crust, is heated up, and then rises to the surface. When heated water from hot springs is forced to the surface, it is a relatively simple matter to capture that steam and use it to drive electric generators. In order to set up geothermal power plants, holes are drilled into rocks to capture steam more effectively to drive electric generators. If water comes out of hot spring

as steam, it can be used directly, whereas hot water of a high enough temperature it can be used as a flash system.

2. *Direct uses of Geothermal Heat:* Geothermal reservoirs of hot water, which are found a couple of miles or more beneath the Earth's surface, can also be used to provide heat directly. This is called direct use of geothermal energy. Direct use of geothermal energy, is a very old method of using geothermal energy when people began using hot springs for bathing, cooking food, and other day to day heating purposes. Besides it, the hot spring water is used to heat greenhouses, to dry out fish and de-ice roads, for improving oil recovery, and to heat fish farms and spas. But, now modern systems are being used for direct-use systems in which a well is drilled into a geothermal reservoir to provide a steady stream of hot water. The water is brought up through well, and a mechanical system - piping, a heat exchanger, and controls - delivers heat directly for its intended use.

3. *Ground-source Heat Pumps:* It is found that the upper 10 feet of the Earth maintains a nearly constant temperature between 10°-16°C. During winter, this ground temperature is warmer than the air above it whereas in summer it is cooler than air. In order to take advantage of this resource, geothermal heat pumps can be set up to heat and cool buildings. Geothermal heat pump systems consist of ground heat exchanger, heat pump unit, and air delivery system. The heat exchanger is basically a system of pipes called a loop, which is buried in shallow ground near a building. Geothermal heat pumps use much less energy than conventional heating systems, since they draw heat from the ground. A much more conventional way to tap geothermal energy is

by using geothermal heat pumps to provide heat and cooling to buildings.

### Advantages and Limitations of Geothermal Energy

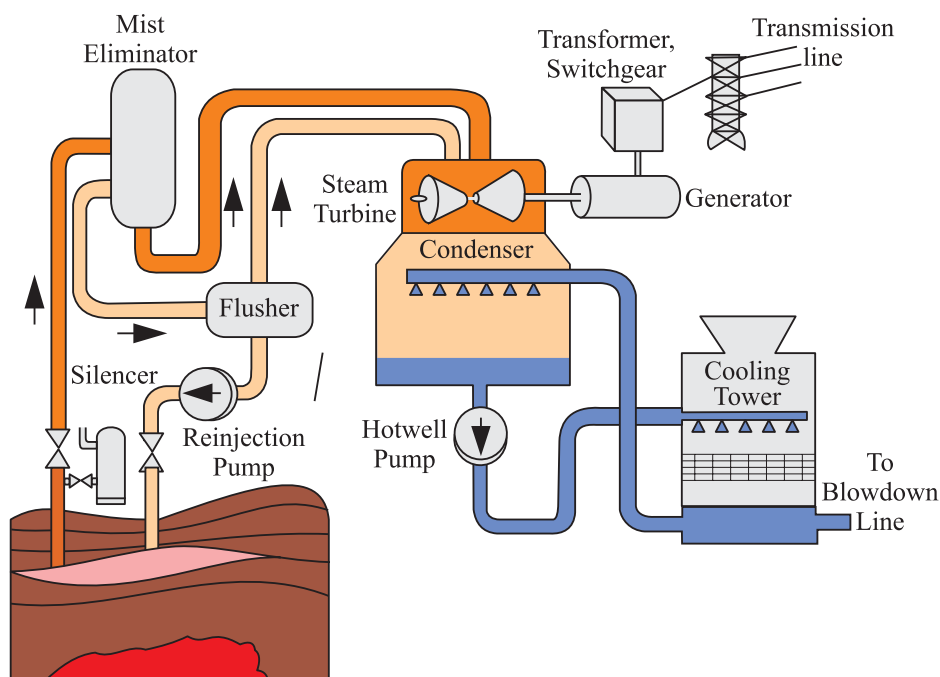
Geothermal energy is used for heating homes and for generating electricity without producing any harmful emissions. The first advantage of using geothermal heat as a source of energy is that, unlike most power stations, a geothermal power plant does not create any pollution and geothermal energy can be used to produce electricity 24 hours a day. Thus, geothermal energy is an excellent source of clean, inexpensive and renewable energy. However, once in a while it may release some gases from deep down inside the earth, that may be slightly harmful, but these can be contained quite easily. If the geothermal energy is harnessed correctly, it leads to no harmful by-products. Geothermal power plants are generally small and have little effect on natural landscape, or nearby

environment. As no fuel is used to generate power from geothermal heat, the running costs for geothermal power plants are very low. Moreover, the cost of the land to build a geothermal power plant is usually less expensive as compared to construction of an oil, gas, coal, or nuclear power plant.

Though geothermal energy has several advantages, it also has certain disadvantages and limitations. If harnessed incorrectly, geothermal energy can sometime produce pollutants. Moreover, improper drilling into the earth can release hazardous minerals and gases. It is also feared that the geothermal power plant sites may run out of steam in the long run.

### Prospects of Geothermal Energy in India

India has a huge potential to become a leading contributor in generating eco-friendly and cost effective geothermal power. Around 6.5% of electricity generation world wide would be done



with the help of geothermal energy and India would have to play a bigger role in coming years in this direction. But, power generation through geothermal resources is still in nascent stage in India. However, recognizing the potential of geothermal energy in India, several geothermal power plants have been established in various parts of the country. In Geological Survey of India has identified about 340 geothermal hot springs in the country. Most of them are low surface temperature range from 37°C to 90°C which is suitable for direct heat applications. These springs are grouped into seven geothermal provinces i.e. Himalayan (Puga, Chhumathang), Sahara Valley, Cambay Basin, Son-Narmada-Tapi (SONATA) lineament belt, West Coast, Godavari basin and Mahanadi basin. Some of the prominent geothermal resources include Puga Valley in Jammu and Kashmir, Chhumathang in Jammu and Kashmir, Manikaran in Himachal Pradesh, Jalgaon in Maharashtra and Tapovan in Uttarakhand. A new location of geothermal power energy has also been found in Tattapani in Chattisgarh. In addition to it, Gujarat is set to tap geothermal electricity through resources which are available in Cambay between Narmada and Tapi rivers.

Puga, which is located at a distance of about 180 km from Leh in Ladakh region of Jammu and Kashmir across the great Himalayan range, is considered to be a good potential of geothermal energy. In Puga valley, hot springs temperatures vary from 30°C to 84°C (boiling point at Puga) and discharge ranging are present up to 300 liters /minute. A total of 34 boreholes ranging in depths from 28.5 m to 384.7 m have been drilled in Puga valley. Thermal manifestations comes in the form of hot springs, hot pools, sulphur condensates, and borax evaporates with an aerial extent of 4 km. The hottest thermal spring shows a temperature of 84°C and the maximum discharge from single spring is 5 liters /second.

Chhumathang spring is another geothermal area located about 40 km north of Puga. The thermal water from Chhumathang is quite similar to the thermal waters at Puga except the difference that its water has relatively higher pH and sulphate. Geothermal activity at Manikaran occurs in the form of hot spring over a distance of about 1.25 km on the right bank of Parvati river with temperature range of 34°C-96°C whereas on the left bank over a distance of about 450 m with temperature range 28°C-37°C. At Tapovan geothermal area, the highest temperature recorded is 65°C. The discharge from this spring varies between 0.83 to 9.2 liter/second. Similarly, Tattapani is most promising geothermal resource in the Peninsular India. Thermal manifestation at Tattapani is very intense in an area of 0.05 sq. km with several hot spots, hot water pools and a marshy land. The surface manifestations show occurrence of white to dirty white deposit identified as silica and moderate to low sag activity. Sixty thermal water springs occur at eighteen localities in the West Coast hot spring belt. One geothermal power project has a capacity of 25MW. Himurja, Himachal Pradesh has decided to select some geothermal resources in Beas valley, Parvati valley, Satluj valley and Spiti valley in Himachal Pradesh for deep drilling up to 2 km for exploitation of geothermal energy.

Obviously, the geothermal energy has great potential as a clean, green and naturally occurring renewable source of energy. Geothermal hot water can be used for many applications that require heat including heating buildings, raising plants in greenhouses, drying crops, heating water at fish farms, and in several industrial processes. It can also be used for generating electricity as well. It is therefore necessary to explore the possibilities of setting up of more geothermal power plants and use the naturally occurring renewable source of energy.

## Srinivasa Aiyangar Ramanujan: A Genius Mathematician

□ Dr. Anil Kumar Singh

Srinivasa Ramanujan was one of India's greatest mathematician. He made substantial contribution to the analytical theory of numbers and worked on elliptic functions, continued fractions, and infinite series. He is hailed as an all-time great mathematician, like Euler, Gauss or Jacobi, for his natural genius. Despite his lack of formal education and a short life-span, he left behind 4000 original theorems.

Srinivasa Ramanujan was born on December 22, 1887, at Erode about 400 km from Madras (now Chennai) where his mother's parents lived. After one year, he was brought to his father's town, Kumbakonam. His parents were K. Srinivasa Iyengar and Komalatammal. He passed his primary examination in 1897, scoring first in the district and then he joined the Town High School. His introduction to formal mathematics began at the age of 10. He demonstrated a natural ability and was given books on advanced trigonometry written by S. L. Loney that he mastered by the age of 12. He discovered theorems of his own and re-discovered Euler's identity independently. He received a scholarship to study at Government College in Kumbakonam, but lost it when he failed in his non-mathematical course work. He joined another college to pursue independent mathematical research, working as a clerk in the Accountant General's office at the Madras Port Trust Office to support himself. He continued to develop his mathematical ideas and began to pose problems and solve problems in the *Journal of the Indian Mathematical Society*. He developed



(1887–1920)

relations between elliptic modular equations in 1910. After publication of a brilliant research paper on Bernoulli numbers in 1911 in the *Journal of the Indian Mathematical Society* he gained recognition for his work. Despite his lack of a university education, he was well known in Madras area as a mathematical genius.

In 1912–1913, with the encouragement of his friends, he wrote to mathematicians in Cambridge seeking validation of his work. Twice he wrote with no response. On the third try, he found G.H. Hardy, who recognized the brilliance of his work, and invited Ramanujan to visit and work with him at Cambridge. In March 1914, Ramanujan boarded a steamer for England. He spent nearly five years in Cambridge collaborating with Hardy and Littlewood and published a part of his findings there. Hardy and Ramanujan had highly contrasting personalities. Their collaboration was

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□ Dr. Anil Kumar Singh, Head of the Department, Basic Sciences, Govt. Polytechnic Garur (Bageshwar), Uttarakhand.



a clash of different cultures, beliefs and working styles. Hardy did his best to fill in the gaps in Ramanujan's education without discouraging him. He was amazed by Ramanujan's uncanny formal intuition in manipulating infinite series, continued fractions and expressed his view as "I have never met his equal, and can compare him only with Euler or Jacobi." One remarkable result of the Hardy-Ramanujan collaboration was a formula for the number  $p(n)$  of partitions of a number  $n$ . A partition of a positive integer  $n$  is just an expression for  $n$  as a sum of positive integers, regardless of order. Thus  $p(4) = 5$  because 4 can be written in five different ways as (i)  $1+1+1+1$ , (ii)  $1+1+2$ , (iii)  $2+2$ , (iv)  $1+3$ , or (v)  $4$ . The number 1729 is known as the Hardy-Ramanujan number invented during visit to the hospital at Putney to see Ramanujan when he was ill. Hardy had ridden in taxi cab having number 1729 and remarked that the number seemed to be a dull one, and was not an unfavourable omen. But Ramanujan replied, "No, it is a very interesting number; it is the smallest number expressible as the sum of two cubes in two different ways."

The two different ways are

$$1729 = 1^3 + 12^3 = 9^3 + 10^3.$$

Generalizations of this idea have created the notion of 'taxicab numbers'. Coincidentally, 1729 is also a Carmichael number.

Ramanujan's years in England were mathematically productive, and he gained the recognition he hoped for. The Cambridge awarded him a B.A. degree by research (this degree was later renamed as PhD) in March, 1916 for his work on highly composite numbers, the first part of which was published as a paper in the *Proceedings of the London Mathematical Society*. The paper was over 50 pages with different properties of such numbers proven. Hardy remarked that this

was one of the most unusual papers seen in mathematical research at that time and that Ramanujan showed extraordinary ingenuity in handling it. In December 1917, he was elected to the London Mathematical Society. He became a Fellow of the Royal Society in 1918, becoming the second Indian to do so. He was elected for his investigation in Elliptic functions and the Theory of Numbers. On 13 October 1918, he became the first Indian to be elected a Fellow of the Trinity College, Cambridge. But the alien climate and culture took a toll on his health. Ramanujan had always lived in a tropical climate and had his mother (later his wife) to cook for him. Now, he faced the English winter, and he had to do all his own cooking to adhere to his caste's strict dietary rules. In 1917, he was hospitalized, his doctors fearing for his life. By late 1918, his health had improved and he returned to India in 1919. But his health failed again, and he died the next year, 1920, at the age of 32 possibly due to liver infection.

During his short lifetime, Ramanujan independently compiled nearly 4000 results (mostly identities and equations). Although a small number of these results were actually false and some were already known, most of his claims have now been proven correct. He stated results that were both original and highly unconventional, such as the Ramanujan prime and the Ramanujan theta function, and these have inspired a vast amount of further research. Recently, Ramanujan's formulae have found applications in crystallography and string theory. Besides his published work, Ramanujan left behind several notebooks, which have been the object of much study. The first notebook has 351 pages with 16 somewhat organized chapters and some unorganized material. The second notebook has 256 pages in 21 chapters and 100 unorganised

pages. The third notebook contained 33 unorganised pages. The results in his notebooks inspired numerous papers by later mathematicians trying to prove what he had found. The English mathematician G. N. Watson wrote a long series of papers about them. More recently the American mathematician Bruce C. Berndt has written a multi-volume study of the notebooks. A fourth notebook with 87 unorganised pages, the so called “lost notebook”, was rediscovered in 1976 by George Andrews. The Notebooks No. 1, 2 and 3 were published as a two-volume set in 1957 by the Tata Institute of Fundamental Research (TIFR), Mumbai, India. This was a photocopy edition of the original manuscripts, in his own handwriting.

The Nation has tributed Ramanujan’s work in so many ways. In 1997, *The Ramanujan Journal* was launched to publish work ‘in areas of mathematics’ influenced by Ramanujan. His home state of Tamil Nadu celebrates 22 December (Ramanujan’s birthday) as ‘State IT Day.’ A stamp picturing Ramanujan was released by the Government of India in 1962 on the 75th anniversary of Ramanujan’s birth, commemorating his achievements in the field of number theory and a new design was issued on December 26, 2011, by the India Post. The Department of Mathematics of the Indian Institute of Technology, Chennai celebrates this day by organising a National Symposium on Mathematical Methods and

Applications (NSMMA) for one day by inviting Eminent Indian and foreign scholars. The Government Arts College, Kumbakonam where Ramanujan had studied and later dropped out, celebrates his birth day as Ramanujan Day by organizing one, two or three day seminars by inviting eminent scholars from universities/ colleges and participants are mainly students of Mathematics, research scholars, and professors from local colleges. A prize for young mathematicians from developing countries has been instituted in the name of Ramanujan by the International Centre for Theoretical Physics (ICTP), in cooperation with the International Mathematical Union, who nominates members of the prize committee. The Shanmugha Arts, Science, Technology and Research Academy (SASTRA), based in the state of Tamil Nadu in South India, has instituted the SASTRA Ramanujan Prize of \$10,000 to be given annually to a mathematician not exceeding the age of 32 for outstanding contributions in an area of mathematics influenced by Ramanujan. This prize has been awarded annually since 2005, at an international conference conducted by SASTRA in Kumbakonam, Ramanujan’s hometown, around Ramanujan’s birthday, 22 December.

In 2011, Dr Manmohan Singh, Prime Minister of India declared the birthday of Ramanujan, December 22, as ‘National Mathematics Day.’

It is not ease but efforts, not facility but difficulty that makes a man.

## Role of Teachers and Parents in Cultivation of Good Habits among Students

□ Dr. Naresh Kumar Sachdeva

### Introduction

Habits play a very important role in development of a child. It may be said that all of our life, so far as it has a definite form, is but a mass of habits – individual, social, emotional and intellectual. Habits inspire, encourage and guide our behavior. Happiness, efficiency and progress in life to a great extent, depend on the cultivation of good habits. Good habits are the most valuable assets of one's life. They had, to a great extent, the essence of character and socialization. Social and moral discipline, emotional and psychological development, all depend upon the habit formation. Hence, it is very important for teachers and parents that they should know and realize the importance of habits, types of habits, characteristics of habits and how habits are formed so that they can help to develop good habits in their children.

### Meaning and Definition of Habit

The term habit has been defined in different ways. Some have called habits as character building traits. Others view habits as a second nature. Definitions of Habit of some of the psychologists are given below:

- (i) **The Duke of Wellington** has defined habit as determiner of one's nature.
- (ii) **William James** defined habit as the tendency of an organism to behave in the same way as it has behaved before.

(iii) **Woodworth** considered habit as well learned performance.

(iv) **Tichner** defines habit as the tendency of a person to be or to do now what it was done on some previous occasions.

Thus, in the light of above definitions, habits can best be defined as acquired, automatic, mechanical and curative dispositions i.e., tendencies to behave in a practical way.

### Kinds of Habits

A. General classification of habits consists of two categories viz. are good habits and bad habits.

**Good habits:** Good habits are those which have a good impact on individual and the society. In order to acquire good habits, it is necessary to have the firmness of determination.

**Bad habits:** Bad habits are harmful for the individual as well as the society. Bad habits are easily formed such as smoking, drinking, gambling etc.

B. According to another classification, habits can be divided into three groups.

(i) **Bodily habits:** These are walking, standing, manner of dress and other activities involving use of body parts.

□ Dr. Naresh Kumar Sachdeva, H. No. 271, Model Town, Near Haryana School, Sonapat (Haryana), Pin – 131001, Dr. Sachdeva is Lecturer in Sociology, DIET, 20th Mile, Sonapat.

- (ii) **Habits of character:** These are character building habits such as punctuality, hospitality, cleanliness, honesty, truthfulness, cooperation, sincerity etc.
- (iii) **Habits of thought:** Habits of thought such as those of thinking, reasoning, keen observation and accurate judgement.

### Importance of Habits

Whereas good habits have a good impact on the progress and development of individual, society and nation, on the other hand, bad habits are harmful and have a bad impact on the individual, society and nation. Bad habits degrade the personality of a person.

Habits play the following role in the life of individuals:

1. **Conserve energy:** Habits play a vital role in life. It is the nature's great gift and have mechanism of conserving energy. Habits lead to the economy of mental and bodily energy.
  2. **Socialization:** Good habits help in socialization. Habits develop the sense of help, cooperation, get together, sympathy, compassion and social service. These qualities help in socialization.
  3. **Character building:** Habits play an important role in character formation. Good habits in a person influence other persons due to qualities like truthfulness. Hence, good character is formed by good habits.
  4. **Personality development:** Habits frequently performed by the individual in routine work, again and again, form the basis of his personality.
  5. **Social order and Moral discipline:** Habit is the basis of social order and moral discipline.
- Good habits lead to the formation of a society having peace, cooperation, unity and spirit of living and working together.
6. **Accuracy and appropriateness:** Habitual actions are performed with great attention and alertness. Hence, these are accurate and appropriate.
  7. **Simplification of movements:** Habits simplify movements. Movements become so swift and certain that a person seems to work like a machine.
  8. **Reduction of fatigue:** Habits are performed by a person wherever needed and desired. Habitual actions are done in a fresh mood and healthy environment. It may be said that a habitual action is not at all straining.
  9. **Adjustment in the environment:** With the help of habits, it is possible for an individual to adjust himself in the environment. Even bad environment sometimes become good on account of good habits. Good habits are boon for not only the rich but also for those who are economically less privileged. Without good habits, life becomes a burden for them. They have to live in very difficult circumstances and these circumstances may make their life hell if they do not get habituated to good habits.
  10. **Importance of habits in Education:** Habits occupy very important place in education. Higher learning is also based, to a certain extent, on good habits. The child's mind is most impressionable to every thing that occurs in the environment. The child who has not acquired the habit of cleanliness, punctuality, obedience, truthfulness, respect for elders and study habits will seldom develop these habits in later life. Hence, great care should be taken

by parents and teachers in developing inclination of children enabling them to react to the situation around them in the most effective and suitable way. Hence, for developing a certain talent, habit formation is essential.

## Cultivation of Good Habits

### A. Rules or laws of habits formation:

William James has mentioned four laws of habit formation:

- (i) Law of firmness of determination
- (ii) Law of Persistence
- (iii) Law of Activities
- (iv) Law of Practice

1. **Law of firmness of determination:** If we want to form or discard a habit we should start with firmness of determination. The firmness of determination should be as strong as possible. Sometimes taking a pledge in public is helpful for determination.

Before an attempt is made to form a particular habit in child, its utility should be explained to him. This will help him to develop firmness of determination. To explain utility of habit, teachers/parents may relate some relevant stories or give an interesting discourse on it. The story of Raja Harish Chandra may be narrated to encourage formation of determination for speaking the truth.

2. **Law of Persistence:** Persistence of habit is of great importance. Never suffer on exception to occur till the new habit is securely rooted in life. e.g., when you have worked for seven days then do not leave at even for one day otherwise habit formation will suffer. For

example, if you get up early in the morning at 4 a.m. for seven days and then miss it on the 8<sup>th</sup> day, then the habit formation of early rising will suffer badly. In other words, there should be persistence as long as habit becomes well rooted.

3. **law of activeness:** For formation of a new habit or discarding an old one, one has to remain constantly watchful and active i.e., when you are determined to form or discard any habit then translate your resolution into action. Start when you think of it because a simple correct action is better than thousand desires.
4. **Law of Practice:** Once a habit is formed, practice is necessary to keep it strong. In the absence of practice, habits may disappear. You may have heard that practice makes a man perfect.

### B. Role of Parents and Teachers in Cultivation of Good Habits:

Parents and teachers play an important role in cultivation of good habits. It is one of the foremost duties the parent and teachers to inspire children to cultivate good, positive and desirable habit by:

1. **Narrating good stories:** The parents/grand parents of the children in early childhood stage should narrate moral and social stories to children to cultivate good habits in them. On the other hand, the teacher should supplement his lectures or talks with interesting stories.
2. **Arousing emotions:** Stories and examples should be told to the students in such a manner that they appeal to their hearts. The teacher should arouse emotions of students. If emotions of students are aroused, the teacher can use energy of students in forming good habits.



3. **Formation of sentiments:** The most important condition of cultivation of good habits is formation of appropriate sentiments. Sentiment is the inner side of habit. Hence the teacher helps the students in formation and development of good habits.
4. **Co-curricular activities:** The teacher should provide practical situations to form such habits. A large number of co-curricular activities should be provided to students to form different types of habits. The teacher should supervise and guide the students.
5. **School atmosphere:** If the school atmosphere right from the peon to principal is conducive to good habits, it will be a powerful source to mould the behaviour of students.
6. **Teacher as a Model:** Teacher should set a model before students as it is said, 'example is better than percept'. As students imitate their teacher in dress, style of talking, walking and such other acts, it is essential that the teacher himself should have good habits. A teacher who himself comes late in the class can not teach his students to come in time or to be punctual. His advice will fail like anything if he sets a bad example.
7. **Sympathetic and affectionate attitude:** The behaviour of the teacher should be sympathetic and affectionate and guided by the attitude of tolerance. He should believe in the principle, "Hate the sin and not the sinner." The attitude will help the teacher to encourage the students to develop good habits.
8. **Use of Reward and Punishment:** Thorndyke's law of reward and punishment may be utilized for formation of a desirable mode of behavior. This may lead to formation of good habits. Undesirable act should be punished. Therefore, parents and teachers should make wise and rational use of reward and punishment.

The teacher should make use of four laws of habit formation in order to cultivate good habits in students.

It may be concluded that parents and teachers can build the character of children by cultivating good habits through the above mentioned methods. Good character of children may lead to all round development of their personality as well as creation of good citizens. Good citizens will help in the progress and development of the society and the nation.

## Basic Infrastructure to Achieve Goal of Universal Elementary Education

□ Dr. Harender Raj Gautam

### Importance of Elementary Education

Elementary education is basic to our education system. Our country has steadily progressed in this area since independence. There has been a consistent rise in the country's literacy rate, which has risen from 18 per cent in 1951 to 74 per cent in 2011. This has been possible due to some innovative initiatives like the Sarva Shiksha Abhiyan (SSA) and the Mid Day Meal Schemes of the Central Government. The Sarva Shiksha Abhiyan has resulted in the establishment of over 200,000 new schools which lead to the additional enrolment of over 21 million children. The programmes like SSA have had a positive impact on gross enrolment ratio at the primary level (Classes I to V) going up to 114.6 per cent and at the upper primary level (classes 6 to 8) to 77.5 per cent in 2001-02. However, the problem of high drop still continues. Further, operationalisation of the Sarva Shiksha Abhiyan has brought down the percentage of out-of-school children from 18.4 per cent in 2000-01 to 4.3 per cent in 2009. These cumulative initiatives since the 1990s have led to a significant rise in overall literacy, school enrolment, infrastructure, thus contributing substantially to universalization of elementary education. Despite being enrolled in schools, many children are not learning properly. Increasingly, parents are seeking alternatives through private inputs such as tuition. Students are dropping out from the secondary schools inspite of significant returns of the secondary education. The District Information System for Education (DISE)

reported in 2012 that 95 per cent of India's rural population lives within one kilometer of primary schools. The Annual Status of Education Report (ASER) 2012 shows that school enrolment stands at over 96 per cent for the fourth consecutive year but the proportion of out-of-school children is slightly up from 3.3 per cent to 3.5 per cent, and it is more for girls (11-14 years) at 6 per cent from 5.2 per cent in 2011. The ASER findings, published by the NGO Pratham, underscore the declining reading levels and learning outcomes across states, with indications that the trend worsened last year. Private schools are clearly becoming more preferred with an enrolment of 28.3 per cent in 2012 from 18.7 per cent in 2006. ASER predicts that India is likely to have 50 per cent children studying in private schools if this trend continues.

### Progress and Challenges

The first official recommendation for inclusion of a fundamental right to education was made in 1990 by the Acharya Ramamurti Committee. In 2002, the 86th amendment to the Constitution introduced Article 21-A making the right to education a fundamental right. For the first time in independent India's history, education as a fundamental right was added in the Constitution. Unlike other fundamental rights, the right to education required an enabling legislation to make it effective. The Right to Education (RTE) Act is this enabling legislation which came into force on April 1, 2010. It has certainly given a hope to boost the literacy rate of the country. According to current estimates,

□ Dr. Harender Raj Gautam, Senior Scientist, Department of Plant Pathology, Dr. Y.S.Parmar University of Horticulture and Forestry, Nauni, Solan-173230, Himachal Pradesh.

implementation of the RTE Act for a period of five years from 2010 would require investment worth around Rs. 2.31 trillion. According to RTE Act, provision is required to be made to provide at least one qualified and trained teacher for every 30 pupils. Currently, there is about one teacher for every 34 students. Around 1.2 million additional teachers need to be recruited to fill this gap. The problem of shortage of teachers is further compounded because of high level of absenteeism of teachers. The UNESCO's International Institute of Educational Planning has undertaken a study on corruption in education recently which indicates that teacher absenteeism in India is about 25 per cent which is next to Uganda on the top. The global average of teacher absenteeism is about 20 per cent.

According to the DISE Report (2009–10), there were 13,03,812 schools imparting elementary education in India. Of these, 80.3 per cent were government run schools and 19.4 per cent were private aided schools. Of these, 87.2 per cent of the schools were located in rural areas. Of the 188 million children enrolled in elementary schools in India, 70 per cent study in public schools. In villages, 84 per cent of children attend government schools. The private sector covers 25 per cent of the children in elementary education, and more than 50 per cent of those in the secondary and the higher education. The average number of classrooms in Primary schools was 3.2 in 2009-10.

### **Lack of Basic Infrastructure**

As majority of the schools are government run, the functioning of these schools has been in sharp focus due to lack of basic facilities which forces the common man to look for alternatives. The Central Government has tried to address these concerns in the RTE Act which makes mandatory to every school to have a separate toilet each for girls and boys, a playground, a library with

sufficient reading material, computers, electrification of the school building, ramp access for disabled students. The recent judgment of the Hon'ble Supreme Court that schools throughout the country must be provided with toilets and drinking water within six months is a clear reminder in this direction. The Supreme Court has observed that lack of toilets and drinking water "clearly violates the right to free and compulsory education of children," children need to "study in a clean and healthy environment" and its ruling is applied to government and privately run schools. Prevailing of such situation fails to retain students in schools. In our schools, the gross enrolment ratio (GER) from Class I to VIII is 94.9 per cent; and from Class I to XII is 77 per cent. It is reported that only 47 out of 100 children enrolled in class I reach class VIII, putting the dropout rate at 52.79 per cent. But, the main task beyond enrolment is to retain the students in schools. The Government schools still lose 25 per cent of their students by Grade V, and 46 per cent by Grade VIII.

Lack of basic facilities in Government run schools has given rise to mushrooming of private schools both in rural and urban areas. These schools charge hefty fees but still parents prefer these schools as most of these provide education through English medium. Consequently, the enrolment in government schools is going down. The National University of Educational Planning and Administration (NUEPA), which tracks the progress of States towards providing universal elementary education, has done exhaustive study on the condition of primary education in our country based on the data received from as many as 1.36 million schools spread over 637 districts across 35 States and Union Territories. The study has been brought in the form of a Report titled 'Elementary Education in India: Progress towards Universal Elementary Education'. This Report indicates that there is increased inclination among parents to enroll their wards in private schools. The enrolment in classes I to V in government

schools decreased by 2.2 per cent in 2010-11 in comparison to 2009-10. On the other hand, enrolment at the same level increased by 3.0 per cent during the same period. According to the Annual Status of Education Report (ASER) 2011 of the Pratham Foundation, the overall enrolment in private schools in the country has gone up from 18.84 per cent in 2006 to 26.09 per cent in 2011. The number of children enrolled in government primary schools has dropped by 21 lakh between 2009-10 and 2010-11 while there has been an increase of 11 lakh in enrolment in private schools. There are number of reasons for school drop outs at various levels and among these poor basic infrastructure of the schools is one of the important reasons. A recent survey conducted by some civil society organizations under the banner of the 'RTE Forum' indicate that only 4.8 per cent of government schools have all nine facilities stipulated under the RTE Act. In rest of the schools, 8.5 per cent schools lack drinking water facilities, 40 per cent lack a functional common toilet, 40 per cent do not have separate toilets for girls, 60 per cent of the schools are not electrified and only one in every five schools has a computer.

### **Strength and Competence of Teachers**

The other critical component is the availability of sufficient number of qualified teachers. Shockingly, thirty-six per cent of all the sanctioned teaching posts are vacant and among the recruited ones, 6.7 lakh teachers are professionally unqualified and untrained. In 2008-2009, on an average, 45 per cent of these teachers had not studied beyond the 12<sup>th</sup> grade. The professional competence can be gauged from the fact that of 91 per cent and 93 per cent of the teacher candidates could not qualify the National Teacher Eligibility Tests conducted by the Central Board of Secondary Education in 2009-10 and

2010-11, respectively. The report further indicates that 40 per cent of primary schools have a classroom-student ratio of higher than 1:30. Approximately, 10.5 per cent of our schools are manned by a single teacher. Despite continuous efforts of the Central Government, nearly 10 per cent of the country's elementary schools have only one classroom and nearly 42,000 of government schools across the country function without a building. It is also reported that out of 12.5 lakh schools in the country today, almost a fifth are unrecognized. Teacher absenteeism is another problem that plagues our education sector. It is 25 per cent in India, in comparison to 16 per cent in Bangladesh and 19 per cent in Indonesia.

### **Future Vision**

The Central and the State Governments are not able to read the mind of the parents about their expectations of a good school for their children. Parents certainly do not want to take any risk as far as career of their children is concerned. According to an estimate, the Government of India spends about Rs 3,000 per child per year for primary education. In the Union Budget of 2013-14, the Sarva Shiksha Abhiyan has been provided Rs.27,258 crore which will help in implementation of the RTE Act. The State Governments must give top most priority to implementation of the RTE Act. Even two years after implementation of the RTE Act, some States are yet to form the state rules to implement the most important entitlement for children in independent India. We must understand that investment in education is the best investment for the development of any country. Education is the most powerful tool which can help the all round development of the country. It is the most important investment in human capital.

## How to Score Good Marks in Chemistry

□ Dr. Rajeev Prasad

Getting good marks in Chemistry is really based on having good performance in examination and assignments. Here are a few tips how to obtain good marks in Chemistry. Remember that each learner learns a little differently. What works for others may not necessarily work for you. You need to find out how to maximise your performance.

In Chemistry, you must work it out for yourself in writing. Solve the problem on paper or write your explanation before you are tested. What you think you know and what you can successfully write down may not be the same.

Chemistry is one of the most interesting branches of science concerned with the structure, properties and composition of particle/matter, as well as the changes that a particle/matter undergoes during chemical reactions. Almost every reaction can be demonstrated in the laboratory and it is very interesting to observe and learn these chemical reactions. You are suggested to send your queries in chemistry at Email- [aochem@nios.ac.in](mailto:aochem@nios.ac.in), without any hesitation. We will be very happy to answer your queries related to Chemistry.

### Some important topics taught in Senior Secondary Chemistry at NIOS are:

- Atomic structure and chemical bonding
- Chemistry of elements
- Electrochemistry
- Solid States
- Chemical Kinetics
- Chemistry of organic compounds



### Marks wise important topics

- Atomic structure and chemical bonding -12
- Chemistry of elements-10
- States of matter-12
- Chemical Energetics-08
- Chemical Dynamics-08
- Chemistry of organic compounds-12

### Tips for Preparation

- If you feel you are not good in Chemistry, start reading your NIOS books as soon as possible.
- Do not try to rush and finish the chapters. You should understand the concepts of different topics so that you may be able to solve questions in a proper way. The reading of a book that deals with scientific concepts, theory and reactions is different from a novel or a comic.
- Follow up your basic concepts with a reference book to gain a deeper understanding of the topics.

□ Dr. Rajeev Parasad, Academic Officer (Chemistry), NIOS, A-24/25, Institutional Area, Sector-62, Noida-201309. U.P.  
e-mail: [aochem@nios.ac.in](mailto:aochem@nios.ac.in)



- Start attending Personal Contact Programme (PCP) and practicals. Perform each and every laboratory experiment. For example, you may not remember the confirmatory tests for acid and basic radicals; but if you perform the experiment, and see what happens, you will remember it for a longer duration. These are also a part of your theoretical chapters.
- Try to grasp the concepts and always ask questions during PCP. Make a list of unanswered questions and discuss them with your tutor again.
- Do not ignore numerical problems. Most of the times, the problems are direct application of the formulae in use and at times, are mixed with your understanding of a topic. Solving numerical problems is a good way to score high marks. Before starting to solve numerical questions in Physical Chemistry like chemical energetic, chemical dynamics, you have to learn logarithm. In chapters like thermodynamics, chemical kinetics, Electro chemistry and ionic equilibrium, you have to solve numerical questions based on logarithm. In chemical equilibrium, you must have idea to solve quadratic equations.
- After you finish your syllabus, revise as many times as possible. Remember, it is better to study one book ten times rather than studying several books at a time.
- When you finish, do take the Sample Papers provided by NIOS on its website [www.nios.ac.in](http://www.nios.ac.in).
- Also, have a look at the answers and the marking scheme on NIOS website, as no other source can give you a better judgment than the one provided by NIOS on its website [www.nios.ac.in](http://www.nios.ac.in)

### Tips for scoring good marks

- During examination, try to write your descriptive answers in points and give pictorial

or graphical illustrations wherever possible. It enhances clarity.

- Read the entire question paper and the directions very carefully.
- Plan the timings accordingly.
- For long answer type questions, before starting, frame a skeleton of answers in the margin.
- Do remember the S.I Units of all entities.
- Be precise and to the point in responding to very short questions.
- Avoid writing irrelevant details.

### Objectives of the Learner Guide

NIOS has brought out Learner Guides in different subjects with the following objectives:

- To facilitate revision of the study materials in a short time.
- To strengthen learning of the content material.
- To support learners to enhance their performance in examination.
- To highlight the important concepts and points of information.

### Tutor Marked Assignments (TMAs)

Tutor Marked Assignments (TMAs) is an important component of the open learning system of NIOS. The significance and the way to prepare assignments of good quality are given below:

- **Significance of Tutor Marked Assignments (TMAs)**

Needless to say that there is great significance of Tutor Marked Assignments (TMAs) in open learning system. In fact, TMAs are an essential and integral part of open learning system. You will get an opportunity to come into contact with your tutor or teacher through TMAs.

NIOS supplies a Booklet of Assignments in different subjects meant for learners. The Assignments REsponse sheets are evaluated by the concerned Tutors in the Study Centers. The Tutor Marked Assignments (TMAs) provides you an opportunity to know your strengths and shortcomings. The suggestions/directions of the tutor help you to make the required improvements in the submitted assignments. This would help you prepare for better performance in your examinations.

- **How to prepare Good Assignments**

While solving assignments, focus on the questions. The questions usually cover the content of a number of lessons. Give required weightage to content from all the lessons. Write responses to the assignments giving headings and sub-headings. Make sure that the important information is covered. The assignments response sheet should be in conformity with the prescribed format. It should neither be too lengthy nor too small.

- **Responding to the Comments of Tutors**

Tutor's comments will enable you to improve and update your knowledge of the subject. It will help you to correct/rectify your mistakes or lapses. The comments of the Tutors will also help you to prepare yourself for better performance in examinations. It is, therefore, imperative and in your interest to take benefit from the comments of tutors on your assignments response sheets.

## Preparing for Examinations

- **Positive side of the Examinations**

A positive side of Examination is that it provides the examinee (the learner) an opportunity to assess his/her knowledge of the concerned subject and also the level of his competence and capability.

- **Myth about Examinations**

A myth about the Examination is that it is the only and sole yardstick to measure, assess and judge the ability, calibre and competency level of examinee. The truth or reality is that out of many other techniques, examination is only one such technique.

- **What to Avoid**

While preparing for Examinations, avoid putting unnecessary stress on your mind about fear of examination. Do not waste much time in cramming all the details. Rather you need to concentrate on the main points of each lesson or the entire study material. We have tried to bring these points to you through the Learner Guide.

- **Revising for Examinations**

Revising all that you have studied is a must while preparing for examination. Revision provides you an opportunity to recall all that has been studied so far. It also enables you to recollect at least the main points of each lesson or the study material.

- **Tips for preparing for Examinations**

The time before examinations is the most crucial time for every learner. Some tips to help you to prepare better for examinations are:

- (i) Do revise your lessons/study material.
- (ii) Maintain the required level of self confidence.
- (iii) Do not allow yourself to suffer from examination fear.
- (iv) Do reach your Examination Centre well in time.
- (v) Keep in mind that you have to complete the answers of all the questions well before the allotted time so that there is enough time for revision of the entire answer book. Also ensure that all the questions have been answered.

## Time Management

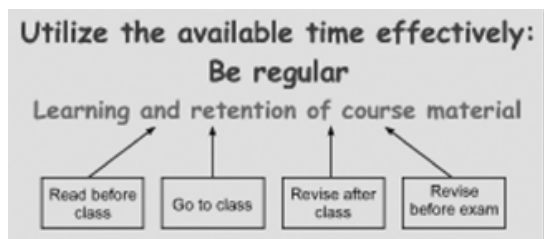
*before and during examination*

Does it sound familiar? Most of the students try to postpone the work till the last minute and do poor work and also get stressed. Will it help if you plan your time and work systematically?

Ever heard the saying, “Manage your time, or it will manage you”? This is true. On the other hand, you can't really manage time, because it is at no one's command – everyone has 24 hours a day, 168 hours a week. So, **you can only manage yourself around the time.**

**Parkinson's Law: Work expands to fill up the available time! You can do lot many tasks if you plan them well.**

Benefits of Time Management	
<p><b>Reduces stress</b> Preparing over a period of time is less stressful than trying to cram an entire course in a few hours before the exam!</p>	<p><b>Makes life balanced</b> Studying all the time does not mean that you are a 'good' student. You also have other things to do. Time to relax is important for all students.</p>
<p><b>Increases output</b> Working long hours lead to slow speed and tiredness. Utilize your time more effectively. Plan to complete tasks within specific time period.</p>	<p><b>Meets goals</b> Setting goals is a powerful way of motivating yourself to work. It also helps you reduce stress over unfinished work.</p>



## Studying for Examination: Tips for better time management:

### Plan in small blocks

For example, plan for an hour. You will only be able to really concentrate for a maximum of 45 minutes, so plan a 15-minute break after that.

### Plan with exactness

- Indicate exactly what you plan to achieve within that time.
- Example of planning without exactness:
  - English 2-4pm;
  - Biology 5-7pm.
- Example of planning with exactness:
  - English – Chapter: Kondiba;
  - Biology – Chapter: Respiratory system

### Plan with the end in mind

- Start from your goal. Check your examination time table and work backward from there.
- To make to the examination, set specific targets to complete by each week.

## Need for a Weekly Planner!

### Plan with your strengths in mind

- When are you most productive, or at your mental best – morning, afternoon, or night? Use these times to study your more difficult subjects/topics.
- Use your down-times to do more mechanical tasks, such as washing, cooking, or shopping (but don't get carried away!).

You probably would not need to divide your time equally between all your subjects. In deciding how much time you want to allocate for each subject, consider the following:

- Amount of study you have done during the term!
- How difficult do you perceive the subject to be?
- Weightage to the examination.
- How well do you hope to do in it?

## Get started with a blank daily Planner

### Plan with flexibility

You should not plan a time-table that is so packed, that it leaves you with no cushion time to perform everyday activities (you still need to eat, rest and take bath!) and of course to deal with unforeseen emergencies/exgrgencies.

### Reward yourself!

After you have accomplished each of the tasks you have set to do, give yourself a break – go for a walk, watch television, or have company of your friend.

## Managing time for Writing Examination

### Allocate your Time

- **Look at how marks are allocated.** The number of marks given to a particular question will give you an indication of how much time to spend on it. Look at:
  - the number of marks per question.
  - how they are distributed.
  - how many questions you have to answer.

Ration your time accordingly and rationally.

Choose ‘easy’ or ‘difficult’ questions.

### Deciding the order of questions to answer?

- It is individuals’ preference. Some students like to answer short answer questions first. There

are others who like to answer long questions in the beginning.

- If you want to start with long questions then time it. Do not be tempted to spend extra time.
- Leave seemingly difficult questions until last. BUT ensure you leave yourself enough time to answer such so called difficult questions.
- Devote extra time to your thoroughly learned questions.
- **Make a note of how much time you should give to each question.** Once you decide on your time outline, stick to it. **Watch the clock,** and once the allocated time has elapsed, stop and move onto the next question.

Are you panicking or tired?

Allow yourself brief periodic rest in the examination. Loosen up physically, stretch (if you can do so without feeling awkward), take several deeper breaths; and shut your eyes when you are thinking.

- **If you haven’t finished, leave lot of space in the exam booklet.** If you have any extra time at the end (or during the revision period) you can return and answer it more fully.
- Do leave time to check and polish your answers at the very end.
- **Don’t leave the examination early.** Use extra time to revise or to think more deeply about one of the harder questions. Make use of all the allocated time - it’s worth it.

## How to Answer Questions

### 1. Words asking you to state everything you know about the question

- **Describe:** Give an account of; tell about; give a word picture of. For example, Describe the temple architecture of the southern India

- **Discuss:** Talk over; consider from various points of view; present different aspects. For example, discuss the observational approach in understanding psychological processes.
- **Review:** Examine the subject critically. Analyze and comment on the important statements to be made out of it. For example, Review the economic condition of India before Independence.
- **State:** Present the main points in brief and clear sequence, usually omitting details of illustrations or examples.
- **Explain:** Make clear; interpret; tell 'how' to do.

## 2. Words asking for main ideas:

- **Enumerate:** Give the points concisely one by one.
- **List:** Write an itemized series of concise statements.
- **Outline:** Organize a description under the main points and sub-points omitting major details.
- **Summarize:** Give the main facts in condensed form i.e., in one or two paragraphs.
- **Trace:** Describe the progress, development, or events from some point of origin. For example, Trace the growth of Indian nationalism from nineteenth century onwards.
- **Analyze:** Discuss the whole in terms of its past. For example, Analyze the working of the Indian Parliament.

## 3. Words asking for specific characteristics or certain limited facts:

- **Compare:** Bring out the points of similarities and the points of differences.

- **Contrast:** Bring out the points of differences.
- **Define:** Give the meaning of a word or concept; place it in the class to which it belongs and set it off from other items in the same class.
- **Relate:** Show how things are connected or correlated within the answer.
- **Interpret:** Translate; give example of; comment on a subject.

## 4. Words asking for your supported opinion:

- **Criticize:** State your opinion of the correctness or merits of an item or issue. Criticism may approve or disapprove.
- **Evaluate:** Give the good and bad points; give an opinion regarding the value of; and discuss the advantages and disadvantages.
- **Justify:** Prove or give reasons for decisions or conclusions.
- **Prove:** Establish that something is true by citing factual evidence or giving clear and logical reasons.

## Length of Answers

How much to write is most often given in the question. Therefore, reading the directions is absolutely essential.

- In some questions, especially essay type, the very fact that it has the maximum marks assigned to it, points to a long answer.
- Where it is clearly stated to write a paragraph or two lines, this should be adhered to.
- Word limit if given is also an indication and should be followed.

## Recommended Books

- NIOS books for the Senior Secondary Chemistry (313).



## Importance of Yoga for Young Learners

□ Dr. Shruti Upreti

The human body is full of potentialities. If we are able to direct, control and focus our energy properly, we can do wonders. A healthy environment can be created in the society if we consider 'yoga' from this angle. The science of yoga is a powerful stream of knowledge. Radiant physical health, serene mind, continuous spiritual uplift and ability for harmonious social living is experienced by yogic practitioners worldwide. There are various yogic breathing techniques that have proved to be beneficial for chronic diseases. The available data indicates that yogic slow breathing practices promote dominance of the internal system, that can help to control the stress, and can contribute to treatment of some chronic diseases. Growing evidences suggest that even low or moderate level of stress can interfere our task performance. There are several reasons why this is so. Ever increasing ambitions, desires and competitions, restlessness and maddening tensions have also increased by leaps and bounds. Ever increasing diseases of insomania, mental deformity impulses, opposing ethical values and destructive instincts are some of the common physiological and psychological problems faced by human beings of today. The modern world, which is said to be the world of achievements, is also a world of stress, pressure, anxiety and tension.

### Researches That Indicates Increasing Stress In The Lifestyle

The Times of India [2007] reported that stress overloads our mental and physical resources and interferes the effective use of skills, thus badly affecting our performance.

The Indian Express [2007] presented the findings made by researchers of Rush University Medical Centre in Chicago, USA. It reveals that people who are often stressed or depressed are more likely to develop cognitive impairment—a form of memory loss.

Akhtar [2006] reported that stress changes brain anatomy, which adversely affects memory. He further claimed that stress brings the changes, which are directly linked to body–mind problems, such as suicidal tendencies, severe depression, obsessive compulsive disorder, over reaction to simple stress or provocations, addictive behaviour, debilitating hypersensitivity that even affects immunity. Nan Little [2006] found that chronic and acute stress causes difficulty with concentration and memory. Determining the extent of stress-related health problems at work is not an easy task. Most countries routinely collect data on ill-health retirements, work days lost due to sickness, injury and disability, etc.



□ Dr. Shruti Upreti, Assistant professor, G.R.D.C.E, G.G.S.I.PU, Delhi



The main victims of today's stress are adolescents and young learners. Adolescence stage itself is period of 3 SSS –**Stress, Storm and Strife**. The person encounters change at the Physical, Mental, Psychological and Social levels, which is but natural. However, our education system has loaded the adolescents with a variety of other pressures such as vast curriculum and syllabus, fear of examination, tough competition of every stage etc. Peer pressure and parental pressure add tons of weight to their problems. Their self-worth gets wrapped around their academic performance.

Adolescents are particularly vulnerable to suicide on account of emotional immaturity and temperamental instability. Parental expectations are largely incongruent with their children's ability, which leads to frustration and depression. Students attempt to commit suicide due to feelings of worthlessness and to escape from social disapproval. The causality graph of adolescents peaks sharply during examination days and the time when result is declared. Academic stress and examination anxiety are cited as causal factors. Parents and teachers perpetuate the feeling of shame by scolding and beating or by subtle but worse methods like withdrawal of affection. Loss of close inter-personal relationship rapidly

worsens the situation. When there is no one to share the pain and anxiety, stress gets out of bounds.

### STRESS AND TASK PERFORMANCE

Psychologists believe that stress actually performs a wide range of tasks. They think that the relationship between stress and task performance takes the form of an upside-down. At first, performance improves as stress increases, presumably because the stress is arousing or energizing. Elsewhere at some point, stress becomes distracting. Then performance actually drops. First, even relatively mild stress can be distracting. People experiencing stress may focus on the unpleasant feeling and emotions it involves, rather than on the task at hand. Second, prolonged or repeated exposure to even mild levels of stress may exert harmful effects on health, and health problems may interfere with effective performance. A large body of researches indicates that as arousal increases, task performance may rise at first but at some point it falls.



## YOGA : A STRESS BUSTER

The history of yoga spans from four to 8,000 years ago to the current days. It is an integral subjective science. It is spiritual, mental and physical that cannot be separated from each other. Yoga stands for mental concentration. It also implies the control of sense. Thus, the second derivation of the word 'yoga' consists 'CittaVrittinirodhah' i.e., the silencing of all activities in the mind's substance. According to Vedanta, yoga means supreme realization. Yoga is the reunion of the living self with the supreme self.

According to *Puranas*, that particular inclination of the mind, which is accompanied by an active desire to know the self and which needs to unite with the principle is called 'yoga'. Yoga does not believe in the temporary cure of the patient because 'the old troubles often reappear in different forms'. It, therefore, prescribes total eradication of mental conflicts, unpleasant urges and tendencies through yogic methods. It claims complete cure of neurotics and psychotics by yogic exercises.

Sage Patanjali's yoga consists of eight steps:

- (i) Yama
- (ii) Niyama
- (iii) Asana
- (iv) Pranayama
- (v) Pratayahara
- (vi) Dharana
- (vii) Dhyana
- (viii) Samadhi



As the researchers have discussed the disadvantages of two extremes of stress [i.e. low stress and high stress] on task performance, there is a need to handle these two extremes sensibly. In this context, yoga can be helpful to a large extent. The yogic exercises are both preventive and curative in their nature. Their benefits are as follows:

- Improved blood circulation.
- Flexibility in the whole body.
- Harmonious development of all muscles.
- The tripod of life, i.e., heart, lungs and brain are kept in healthy condition.
- Cleans throat and lungs.
- Improves digestion.
- Proper functioning of different glands i.e. thyroid, pituitary, pineal etc.
- Improves memory and concentration.
- Reduces stress and anxiety.
- Enhances motor reflex and sharpen observations.
- Develops a sense of personal meaning in the world.



Some Yoga Postures

## Yoga is a boon for Children with Special Needs

Yoga techniques are designed to enhance the natural development of children with special needs. The styles of Yoga are gentle and therapeutic – safe for babies and children with Down Syndrome, Cerebral Palsy, Autism and other developmental disabilities. These methods also provide an effective treatment for children diagnosed with Attention Deficit Disorder, ADHD and Learning Disabilities.

## Advantages of Yogic Therapeutic Programmes

- An integrated series of balanced Yoga programmes increases body awareness and strength.
- Specialized breathing exercises and relaxation techniques improve concentration and memory.
- An early intervention programme assures healthy formative development of infants and toddlers.

## CONCLUSION

To sum up, we can say that stress has become a threat to human beings in today's world. Continued exposure to stress results in decline in the body's overall functioning because of continued secretion of stress-related hormones. Stress affects our immune system due to which our task performance suffers badly. Apart from physiological impact of stress, one suffers at psychological level too. Everybody's life is full of ups and downs and we can't get rid of stressful situations but we can make ourselves strong

enough to face these stressful life situations with the help of yoga. Yoga deals with the practical aspect of our life and makes us aware and experience the higher dimensions of our nature or self. This leads to the unity of the higher self.

Yoga breathing practices may provide insight into valuable respiratory techniques and control of important variables. These practices are intended to maintain optimum health with particular emphasis on stress reduction. In addition to breathing exercises, we can take benefit from different yoga asanas and meditation also to manage our stress and tackle stress related problems.

Meditation is a mental exercise in which we direct our mind to think inwardly by shutting our sense organs to external stimulations. Meditation implies taking mind away from daily trivialities of life and focusing on something higher. It controls our minds and thought processes.

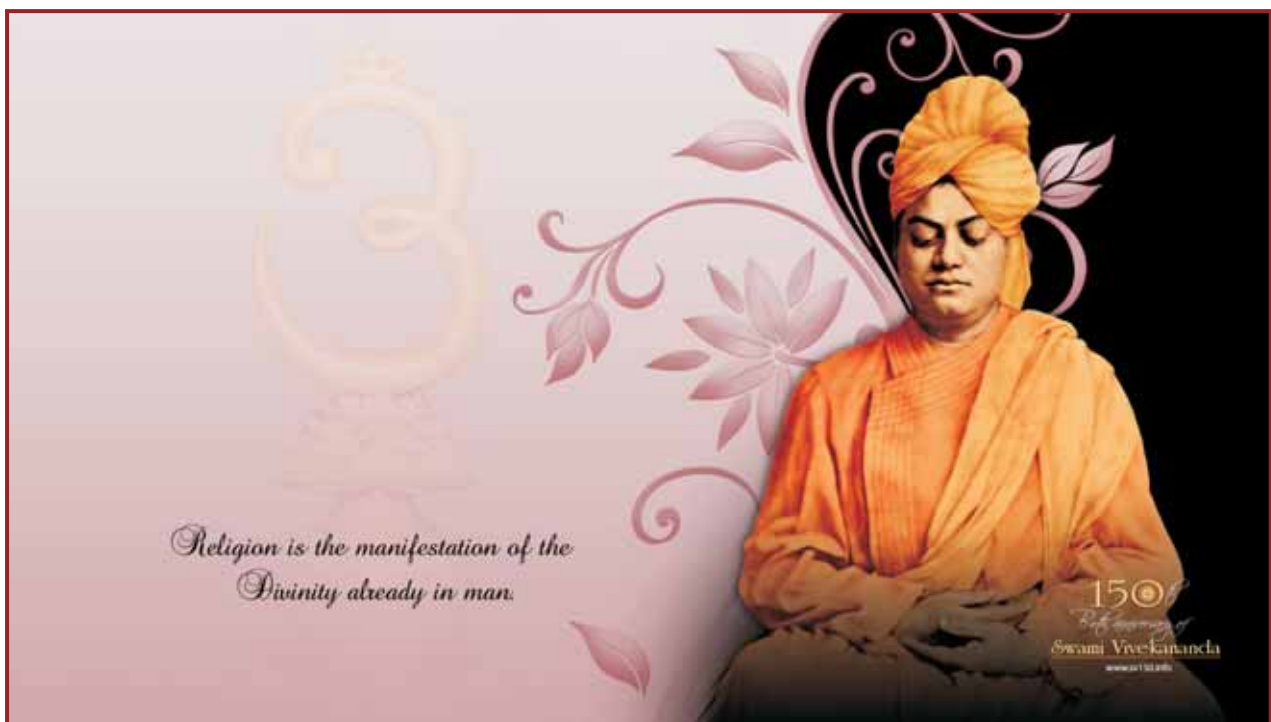
Yoga kills our negative thoughts and fills optimism and enthusiasm. Through this, the body and mind are energized by freshness and become ready to take initiatives to accept the challenges of life. The outlook towards life and world becomes positive and progressive.

Yoga makes the man self-disciplined and punctual. The combination of Asanas, Pranayama, Pratyahara, Mudra Bandh, Mantra, Kriyas, Yog – Nidra, Meditation, Trataka etc., help develop the ability to remain active and alert at physical as well as mental level. The person achieves the strength to experience his own inner power in most demanding situations of the life. This all proves that yoga exercises are beneficial for our young generation learners to combat the academic stress.



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## That Lost Tiara: The Condition of A Girl Child In India

□ Madhuri Gautam

Last night, in my dream, I saw a girl with a beautiful smile, wearing a frock, dancing to the soft music and laughing merrily in a large room. The moment was mesmerising but suddenly the lights went off and the girl stopped dancing. She was frightened and started crying. The next moment, everything was dark and the door was locked. I rushed towards the door and tried to open it. I couldn't get pass through it and suddenly the noises faded into the darkness and silence prevailed. The door opened but all I could see was a shining tiara lying on the floor. That little princess was gone and then, I woke up.

This horrible dream is today's bitter truth and cruelty of the section of people in our society for whom a girl means nothing more than shame and burden. In today's fast paced world where women are working shoulder to shoulder with men and are achieving equal amount of success, there are numerous incidents of infanticide in our country.

And I am more shocked on witnessing such gruesome acts happening every day. In the baby Afreen case, the father tried to take his infant daughter's life in the most hideous manner possible. What was the crime of that infant? How can a father do that to his own child? And she is not the only one. Numerous such cases of tender souls being crushed go unnoticed.

Is being a girl a grave mistake? When God never discriminated between the two genders then why is the man created by the same God questioning

and even curbing the existence of a girl. On one hand where women are achieving success and the country is developing, why is the narrow mindedness gaining power and making women helpless? It is shameful that when people are building strong concrete houses, the mere human civilisation is residing on shaky grounds with such acrimonious acts flourishing.

What is it that gives someone the audacity to snatch away the most beautiful gift of nature? Is the person blind to the twinkling of her eyes, deaf to her cries? The truth is that a section of our society has become handicapped towards the existence of a girl. I am fed up with such notions and I stand against the people for whom a girl is merely a burden and mistake.

*I am proud to be a girl and have the right to live, the right to freedom, the right to speak and above all, the right to happiness same as everyone else. Also, it is our duty to be aware against such evils so that no Afreen loses her life. Today's youth has the power that can do wonders and should come forward to eradicate such discrimination. Through this article, I appeal to the readers to come forward and make others realise the value of the girl as well.*

Only then she will be seen laughing and dancing again with shining tiara on her head. After all, a daughter is a happy memory of the past, joyful moment of present and hope for the future.

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□ Madhuri Gautam, Student of BE(IT) 4th year of Delhi Technological University

## Leisure

“**Leisure**” is a poem by Welsh poet William Henry Davies from his *Songs Of Joy and Others*. Thereafter published in 1911 by A. C. Fifield and then in Davies’ first anthology *Collected Poems*, also published by Fifield in 1916.



What is this life if, full of care,  
We have no time to stand and stare.  
  
No time to stand beneath the boughs  
And stare as long as sheep or cows.  
  
No time to see, when woods we pass,  
Where squirrels hide their nuts in grass.  
  
No time to see, in broad daylight,  
Streams full of stars, like skies at night.  
  
No time to turn at Beauty’s glance,  
And watch her feet, how they can dance.  
  
No time to wait till her mouth can  
Enrich that smile her eyes began.  
  
A poor life this if, full of care,  
We have no time to stand and stare.

**William Henry Davies**

## एक बूँद

ज्यों निकल कर बादलों की गोद से,  
थी अभी एक बूँद कुछ आगे बढ़ी।  
सोचने फिर-फिर यही जी में लगी,  
आह, क्यों घर छोड़कर मैं यों कढ़ी।  
दैव मेरे भाग्य में है क्या बदा,  
मैं बचूँगी या मिलूँगी धूल में।  
गिर पड़ूँगी चू अँगारे पर किसी,  
या गिरूँगी मैं कमल के फूल में।

बह गई उस काल कुछ ऐसी हवा,  
वह समंदर ओर आई अनमनी।  
एक सुंदर सीप का मुँह था खुला,  
वह उसी में जा गिरी मोती बनी।

लोग यों ही हैं झिझकते-सोचते,  
जबकि उनको छोड़ना पड़ता है घर।  
किंतु अक्सर छोड़ना घर का उन्हें,  
बूँद-सा कुछ और ही देता है कर।

**अयोध्या सिंह उपाध्याय 'हरिऔध'**



सुगमताएँ नहीं अपितु प्रयास, सुविधाएँ नहीं अपितु  
कठिनाइयाँ बनाती हैं व्यक्ति को समर्थ

कार्य प्रारम्भ करने के समय कई बार बहुत से व्यक्तियों को कार्य की सफलता के बारे में संदेह एवं कठिनाइयों का भय रहता है। यदि आत्मविश्वास के साथ आगे बढ़े तो संभव है कि अकेली बूँद के समान सीप में गिर कर मोती बन जाए।

इस कविता से यह प्रेरणा मिलती है कि आत्मविश्वास के साथ कार्य प्रारंभ करना चाहिए। मार्ग की कठिनाइयाँ स्वतः सुगम होती चली जाएँगी।

### Part–III

#### News and Views

- National Consultative Workshop on "Learner Support in Open Schooling"
- NIOS Silver Jubilee Lectures
- AWARDS - Times of India Social Impact Award - 2012
- National Award for Best Accessible Website
- National Science Day
- NIOS launches Diploma Programme in Elementary Education
- NIOS Extends its Educational Opportunities to Chhattisgarh
- Annual Meet of National Consortium for Open Schooling (NCOS)
- International Conference on "Education for All: Role of Open Schooling"
- Exhibition of HUNAR
- Delegation from Prime Minister's Office visits NIOS
- Training of Teachers of Accredited Vocational Institutes
- Meeting with NSDC
- Letter of Appreciation
- Success Story
- NIOS Learners invited to formulate the Odisha State Youth Policy
- Some Suggestive Guidelines for Contributing Articles in Open Learning Magazine (OLM)
- Fundamental Duties of Citizens

## News and Views

### National Consultative Workshop on “Learner Support in Open Schooling”

A two day National Consultative Workshop on “Learner Support in Open Schooling” was organised by the National Institute of Open Schooling (NIOS) on February 25 and 26, 2013 at NIESBUD, NOIDA.

Third in the series of consultative workshops held earlier in the areas of curriculum framework and study materials, this workshop covered issues such as Face to Face Learner Support; Use of ICT and the Use of Media and Online Support in the area of Open Schooling.



Dr. S.S. Jena, CM, NIOS addressing the participants

While delivering the inaugural address, Fr. Kunnunkal, Founder Chairman, NIOS pointed out the huge challenge before the NIOS to cater to independent learners in the open schooling system without much personal support. He also said that the human dimension in the form of personal commitment is an important aspect of providing learner support to these learners.

Dr. S.S. Jena, Chairman, NIOS in his keynote address also emphasized on the importance of Learner Support in the Open Schooling System

through Study Centres facilitated by the NIOS and hoped that this workshop would pave the way for the development of a suitable strategy plan for delivering effective Learner Support.

Dr. Kuldeep Agarwal, Director (Academic), NIOS welcomed the participants and Sri. U.N. Khaware, Secretary, NIOS proposed a vote of thanks.

### Third NIOS Silver Jubilee Lecture

The National Institute of Open Schooling (NIOS), as a part of its silver jubilee celebrations, has been organizing a series of lectures delivered by eminent persons. As a part of this endeavour, the third lecture in this series was delivered by Prof. R. Govinda, Vice-Chancellor, National University for Educational Planning and Administration (NUEPA) on 24 January, 2013 at the India International Centre, Max Muller Marg (Near Lodhi road), New Delhi. Titled “Educating Children for the Emerging Society: In Search of a New Paradigm of Schooling”, the lecture highlighted the challenges of an emerging knowledge society, the ways and means by which children cope up with these challenges and the emergent need for school to re-invent itself in search of a new paradigm.



Prof. R. Govinda delivering the lecture



### Fourth NIOS Silver Jubilee Lecture

The Fourth NIOS Silver Jubilee lecture on “Open Schooling for Education and Economic Development: Possibilities, Issues and Challenges” was delivered on 14th February 2013 by Dr. Armoogun Parsuramen, Former President, Global Rainbow Foundation, Mauritius and Former Director and Representative, UNESCO at the India International Centre, Seminar Hall, Max Muller Road, Lodhi Road, New Delhi.



Dr. Armoogun Parsuramen delivering the Silver Jubilee Lecture

Dr. S.S. Jena, Chairman, NIOS welcomed the gathering and introduced the participants.

Dr. Parsuramen, in his lecture, particularly referred to some of the national challenges like best

services to be provided by the NIOS to those with special needs; connectivity with learners through ICT, IEC, material, social networking; strengthening their study centers; increasing access and improving quality in vocational streams.

In her presidential address, Ms. Vrinda Swarup, Additional Secretary, Department of Education and Literacy, MHRD, Government of India pointed out that that the NIOS has emerged as an important tool for those who are most excluded in any respect. She urged the NIOS to take up the task of capacity building of teachers in the State Open Schools.

Dr. Kuldeep Agarwal delivered the vote of thanks.

### AWARDS

#### TOI Social Impact Award – 2012

The NIOS was selected as the winner of the Social Impact Award 2012 instituted by Times of India in partnership with J.P. Morgan in the Education segment under the Government Category.

The award is given in recognition of the magnificent work done by an individual or groups or institutions making an impact in the society in various segments including Education. The award



recognises the work of NIOS in imparting education including vocational skill to millions of out of school learners. The award was conferred on 28th January 2013 at a function in presence of high level dignitaries. Ms. Tamana Chona, a young school teacher who was born with cerebral palsy and an NIOS beneficiary gave away the award to Dr. S.S. Jena, Chairman, NIOS.

### **NIOS receives National Award for Best Accessible Website**

The National Institute of Open Schooling (NIOS) received the National Award for the Empowerment of Persons with Disabilities, 2012 instituted by Ministry of Social Justice and Empowerment, Govt. of India. The NIOS got this award under the category of Best Accessible Website for making its website [www.nios.ac.in](http://www.nios.ac.in) completely accessible for persons with disabilities. This Award was conferred by the Hon'ble President of India at Vigyan Bhavan, New Delhi on 6th February, 2013. Dr. S.S. Jena, Chairman, NIOS received the award.

The NIOS website meets the Guidelines for Indian Government Websites (GIGW) and adheres to Level AA of the Web Content Accessibility



Hon'ble President of India, Sh. Pranab Mukherjee presenting the award to Dr. S.S. Jena, CM, NIOS

Guidelines (WCAG 2.0) of the World Wide Web Consortium (W3C). The website is bilingual in Hindi and English. It also has provisions of Screen Reader, increasing text size, color contrast scheme etc. for disabled learners. Regularly updated, the website can be accessed through mobile phone and integrated SMS alert.

### **National Science Day**

The National Science Day was celebrated on 28th February 2013 in collaboration with Vigyan Prasar, Department of Science and Technology, Noida at Regional Centre of NIOS, A-31, Sector -62, Noida. Various competitions were organised for NIOS learners followed by Quiz competition for NIOS Officials. Prof. Guvinder Singh Sodhi, Khalsa College, New Delhi, delivered a lecture on "Management of Crime Scene Evidence". Dr. Madhu Phul, former Senior Scientist, NCSTC, Ministry of Science & Technology, New Delhi, delivered a lecture on "An odyssey of the mind". The programme ended with the prize distribution ceremony.

### **NIOS launches Diploma Programme in Elementary Education**

The National Institute of Open Schooling has launched a Two-Year Diploma Programme in Elementary Education (D.El.Ed.) for in-service untrained teachers in Jharkhand state serving in Government schools through ODL (Open Distance Learning) mode. The eligibility for admission to this programme is pass in Senior Secondary examination with 50% marks (45% marks for SC/ST) as per NCTE norms. The total admission fee is Rs.12,000/- per trainee for two years. It comprises of 4 types of courses: Group-I-Contextual Issues, Group-II-Teaching-Learning at Elementary/Primary level, Group-III-Teaching-Learning at Upper Primary level and Group-IV-Internship in Schools. The state has almost 20,000

servicing teachers at primary and upper primary levels. The programme is being implemented jointly in collaboration with Govt. of Jharkhand and will benefit all teachers who are untrained in the state working with the government schools and to meet the requirement of Right to Education Act implemented by the state. The State of Meghalaya also has requested NIOS to offer the programme for the in-service untrained teachers in the state.

### **NIOS Extends its Educational Opportunities to Chhattisgarh**

A Regional Centre of the National Institute of Open Schooling (NIOS) was inaugurated in the DIET Campus at Raipur by Dr. Raman Singh, Chief Minister of Chhattisgarh on February 4th, 2013, to extend educational opportunities through Open and Distance Learning (ODL) methodologies to prospective learners. The other eminent guests were Shri Brijmohan Agrawal, Education Minister, Govt. of Chhattisgarh, Dr. S.S. Jena, Chairman, NIOS, Shri K.R. Pisda, IAS, Secretary, School Education and Shri U.N. Khaware, Secretary, NIOS. Shri Brijmohan Agrawal, stressed on need for the NIOS to serve

the purpose of spreading education to every nook and corner of the state of Chhattisgarh. He also added that the Govt. of Chhattisgarh is determined to make the state a 100% literate state. He assured the officials of all support and help by the Govt. in the noble venture of spreading education for the benefit of society. Shri U.N. Khaware, Secretary, NIOS proposed a vote of thanks.

Presently, the NIOS has an enrolment of about 3500 learners in 54 Accredited Institutions (Study Centres) spread throughout the State of Chhattisgarh. It is hoped that the flexible nature of the Open Schooling system will provide a solution to several more learners who are out of school in this state and keen to continue education, through its courses offered at the Secondary and Senior Secondary levels with an emphasis on skill development.

### **Annual Meet of NCOS**

The Annual Meet of the National Consortium for Open Schooling (NCOS) was organized at Raipur, Chhattisgarh from 4th to 5th February, 2013. The meeting was inaugurated by Sh. Brij Mohan Aggarwal, Hon'ble Education Minister, Chhattisgarh.



Inauguration of NIOS Chhattisgarh Regional Centre



Dr. S.S. Jena, CM, NIOS welcoming Sh. Brij Mohan Aggarwal, Hon'ble Education Minister, Chhattisgarh



### Capacity Building Workshop

A Three day Capacity Building workshop was jointly organized by the NIOS and CEMCA from 11-13 February, 2013 for the staff of NIOS and State Open School, at IUC Multimedia Computer Lab, IGNOU, New Delhi. The theme of workshop was 'Promotion of Virtual Open Schooling in India'.



Dr. S.S. Jena, CM, NIOS addressing the Workshop participants

### International Conference

The National Institute of Open Schooling (NIOS) organised an International Conference on **“Education For All: Role of Open Schooling”** from 13 to 15 March, 2013 at New Delhi. The sub-themes of the conference were Issues of Access & Equity; Issues of Quality (materials, curriculum, delivery system, evaluation); Institutional related issues and operational strategies and Issues pertaining to Skill Development through Open Schooling.

The objectives of the conference were to exchange and share existing national and international experiences/practices for achieving Education for all ; discuss issues and concerns pertaining to education for all at different levels and types of school education and suggest strategies and interventions to achieve the goal of Education for All through open schooling. Experts in EFA/ODL



Dr. M. M. Pallam Raju, Hon'ble Minister of HRD, Govt. of India inaugurating the conference.

from India & abroad, Educational Planners/Policy makers/Administrators from India & abroad as well as Representatives of Open Schools from India & abroad participated in this three day conference.

The Conference was inaugurated by Dr. M.M. Pallam Raju, Hon'ble Minister of Human Resource Development, Govt. of India. Sh. R. Bhattacharya, Secretary, Department of School Education and Literacy, MHRD, GOI was the Guest of Honour. Dr. S.S. Jena, Chairman,



Dr. Sugata Mitra addressing the participants

NIOS welcomed the gathering. Dr. Kuldeep Agarwal, Director (Academic), NIOS spoke on the details of the conference and a vote of thanks was proposed by Sh. U.N. Khaware, Secretary, NIOS.

The conference began with a keynote address on “*From Education for All to Learning for All*” by Ms. Frances Ferreira, Education Specialist, Open Schooling, Commonwealth of Learning (COL), Canada followed by an address on “*The Future of Learning*” by Dr. Sugata Mitra, Professor of Educational Technology, Newcastle University, UK.

The post lunch session witnessed a keynote address by Dr. Vinod Raina, Bharat Gyan Vigyan Samiti on “*Access and Equity in School Education: Issues & concerns for open Schooling*”. This was followed by a Panel Discussion on *Issues of Access and Equity* chaired by Fr. T.V. Kunnunkal, Former Chairman, NIOS. Panelists Prof. Usha Nayar, Professor (Retd.), NCERT, New Delhi, Prof. S. Mukhopadhyay, Professor (Retd.), NUEPA, New Delhi and Prof. Janaki Rajan, Professor, Jamia Millia Islamia, New Delhi spoke on the Gender, Disability and Holistic



Ms. Frances Ferreira, Education Specialist, COL delivering the keynote address.

perspectives. Paper presentations on *Issues of Access and Equity; Issues of Quality and Institutional Related Issues and Operational Strategies* also formed part of this session.

A colourful Cultural Programme marked the end of the programme on the first day.

The second day of the Conference began with a keynote address on “*Quality in School*



Conference Participants



*Education: Issues & Concerns for Open Distance Learning*” by Prof. Shyam Menon, Vice Chancellor, B.R. Ambedkar University, Delhi, India followed by a Panel Discussion on *Vocational Education and Skill Development*. This discussion was chaired by Ms. Fancy Amey, Director, Learner Support, Botswana. College of Distance and Open Learning (BOCODOL), Botswana. Panelists were Dr. Joginder S. Sodhi, Shri Ram Centre for Industrial Relations, Human Resources, Economic & Social Development, New Delhi, Ms. Ankita Mishra Bundela, Dy. Secretary, Ministry of Human Resource Development, Govt. of India, New Delhi and Dr. K.P. Wasnik, Director (Vocational Education), NIOS, Noida.

The afternoon session began with a Keynote Address by Dr. Santosh Panda, Professor, Distance Education, STRIDE, IGNOU on *“Planning the Instructional Strategies in School Education: Implications for Open Schooling”*. Paper presentations on issues related to *Issues of Access and Equity; Issues of Quality; Institutional Related Issues and Operational Strategies and Vocational Education and Skill Development* were also held.

Poster Presentations marked the end of the programme on the second day.

A Keynote Address by: Prof. (Dr.) Mukti Mishra, President, Centurion University, Odisha on *“Integrating Skill Development in School Education: Implications for Open Schooling”* marked the beginning of the programme on the third day.

A Panel Discussion on *“Institutional Related Issues and Operational Strategies”* chaired by Prof. M.M. Pant, Former Pro-Vice Chancellor, IGNOU included Speakers such as Prof. M.N. Deshmukh, Former Director, SSA, IGNOU; Dr.



Ms. Lystra Sampson - Ovid, Education Consultant and Director, Trinidad & Tobago Open School presenting her paper

R.C. Sharma, IGNOU, New Delhi; Sh. S.K. Prasad, SAP, NIOS and Dr. Kuldeep Agarwal, Director (Academic), NIOS, Delhi.

Paper presentations on issues related to *Issues of Access and Equity; Issues of Quality; Institutional Related Issues and Operational Strategies and Vocational Education and Skill Development* continued on the third day too.

The three day conference concluded with the Valedictory session. The Valedictory Address was delivered by Ms. Fredrika Meijer, Country Head (India, Nepal, Bhutan), UNFPA.

### **NIOS Silver Jubilee Lecture**

The NIOS has been organising a series of lectures by eminent persons to celebrate its Silver Jubilee Year. As a part of this endeavour, a lecture on *“Reflecting on Open Educational Practices”* was delivered on 1 April 2013 by Dr. Som Naidu, Associate Professor and Director of Learning and Teaching, Charles Sturt University, NSW, Australia, at NIESBUD, NOIDA.



Ms. Fredrika Meijer, Country Head, UNFPA being welcomed by Dr. S.S. Jena, CM, NIOS at the valedictor session



Seen From L to R: Dr. Kuldeep Agarwal, Director (Acad.), NIOS; Dr. S.S. Jena, CM, NIOS; Dr. Som Naidu, Associate Professor Charles Sturt University, Australia; Sh. U.N. Khaware, Secretary, NIOS

Dr. Kuldeep Agarwal, Director (Academic), NIOS welcomed the gathering and introduced the speaker. Explaining the concept of ‘Open Learning’ as that which enables access to education, Dr. Som Naidu spoke about big game changers in this area such as the rising phenomenon of **MOOCs** (Massive Open Online Courses) which is transforming education; **Open Educational Resources (OER)** which provides teaching, learning and research materials in varied formats ; **Open University** which is a virtual collaboration of like-minded institutions creating

flexible pathways for OER learners to gain formal academic credit; **producing videos to reinvent education which are freely available on the web** and **Open Badges** which are records of achievement signifying accomplishments such as completion of a project, mastering of a skill or marks of experience.

Dr. S.S. Jena, Chairman, NIOS in his address, appreciated the fact quoted by Dr. Naidu that ‘distance education gave birth to the instructional designer’ and hoped that a credible Open Schooling System would be built in the years to come, by using the big game changers.

Sh. U.N. Khaware, Secretary, NIOS proposed a vote of thanks.

### Exhibition of HUNAR

An Exhibition was organized by National Institute of Open Schooling (NIOS), for the learners of Delhi Hunar Project on 3rd March 2013 at Garden of Five Senses, New Delhi. The objective of this exhibition was to encourage the learners who are enrolled in the Hunar programme. About 80 students and trainers participated from different Hunar Centres. Organizations such as Muslim Women Welfare Organization, New Delhi, Buniyad Educational and Social Welfare Society,



Exhibits of Huna Learners

Shaheen Bagh, New Delhi, Bedar Social and Welfare Trust, Noor Nagar, Okhla, New Delhi and Today's Women Centre, Okhla, New Delhi showcased the skills of learners in this Exhibition.

Exhibits such as Salwar Kameez, Photo frames, Table mats, Fridge cover, Glass and Jug cover, Bedsheets, Quilt covers etc. prepared by the learners as a part of different Vocational trades were displayed.

More than a thousand people visited the stall and were impressed with the myriad of skills displayed by the learners trained under the Hunar Project. They showed keen interest in the displayed items. One of the groups from Indian Railways especially showed interest in the displayed items. Dr. Sanyam Bhardwaj, Director (SSS), NIOS personally visited the stall and took stock of the exhibition and various items displayed for the visitors. He interacted with the learners and motivated them. An interesting aspect of the exhibition was the instant beauty and hair style tips offered by the learners to the girls who visited the exhibition, free of cost.

### **Delegation from Prime Minister's Office visits NIOS**

A Delegation from the Prime Minister's Office comprising of Mr. J.P. Rai, Executive Director, NCSD; Mr. Shikar Agrawal, P.S. to Advisor to PM and Ms. Ruchi Verma, Consultant visited the NIOS on 4th March 2013 to understand the functioning of NIOS and its Vocational Education Department in particular. The Chairman, NIOS; Director and Officers, VED attended the meeting and explained about the NIOS, Vocational Education Department, its functioning and initiatives thereof.

### **Training of Teachers of Accredited Vocational Institutes (AVIs)**

The first training programme was organized for the IT vocational teachers in collaboration with

PSSCIVE, Bhopal at NCERT, New Delhi from 30th March 04th April 2013.

The training was inaugurated on 30th March 2013 by Dr S.S. Jena, Chairman, NIOS. Prof. Rajaram Sharma, Joint Director, CIET; Prof. Mridula Saxena, Head, Department of Home Science and Hospitality Management, PSSCIVE; Dr. K.P. Wasnik, Director, Vocational Education Department and Dr. V.S. Mehrotra, Associate Professor and Head, Curriculum Development and Evaluation Centre, PSSCIVE were also present, during the occasion. The training was attended by 17 vocational IT teachers of different AVIs of NIOS.



Training Programme for IT Vocational Teachers

The training modules were designed and developed to expose the vocational teachers of IT to the traditional and new teaching methods and technologies, which can be applied in classroom setting, open learning environment, workshops and on-the-job training.

The programme concluded on 4th April 2013, with the distribution of certificates to the participants by Prof. Parveen Sinclair, Director, National Council of Education Research and Training (NCERT).

### **Meeting with NSDC**

A meeting was organized with the CEOs and representatives of 5 Sector Skills Councils of



NSDC on 4th April 2013 at the NIOS headquarters at NOIDA. Dr. S.S. Jena, Chairman, NIOS; Lt. Gen. S.S. Chahal, CEO SSC (security); Mr. Sunil Chaturvedi, CEO SSC (Automotive); Mr. Narinder Bhatia, CEO SSC (Media & Entertainment); Mr. R. Subramanyam, SSC (Retail); Mr. Sanjay Chabhra, SSC(Health care); Mr. Rajiv Mathur, Principal, QA, NSDC, few representatives of AVIs, NIOS Heads of Departments and the Faculty of VED were present on the occasion.

Presentations were made by the representatives of NIOS and sector skills councils of NSDC. It was agreed that NIOS will sign a MOU with SSCs and NSDC.

### Teleconferencing Programme

The Vocational Education Department organized a Teleorientation Programme for the coordinators of Accredited Vocational Institutes of National Institute of Open Schooling, at EMPC, IGNOU, New Delhi on 29th April 2013. The objectives of the program were to orient the coordinators about the conduct of practical examinations and discuss issues related to student support services, material distribution, and to take their views on promotional strategies and identification of region specific courses.

Respected Sir,

My son appeared for the NIOS secondary exam held in April 2013. He has a learning disability and was unable to cope up in a main stream school. After appropriate consulting, I got him admitted in a special school at Chennai and registered for the NIOS school system.

I was with him during the exam sessions and was very impressed by the way the exams were conducted; both theory and practicals. Also at that time, I got to meet a large section of people from different walks of life who had come to write the exams. Each one had a story to tell and it was then I realized what a boon the NIOS system is for such unfortunate people.

The systematic scheduling, wide variety of choices available are worthwhile and very useful.

Congrats, sir and may god always be with people like you taking education to every corner of our country.

Dr. B. Praveen. MDS  
#153, Strahans Road,  
Pattalam,  
Opp. Yadgar Kalyana Mandapam,  
Chennai - 600012, Tamilnadu, India

### Success Story

**Sri Vijay Kumar Sarma**  
**Enrolment Number 080010112005**

Sheer determination and perseverance has enabled 62 year old Sri Vijay kumar secure 60.2 % in the NIOS Secondary Examination held in April/ May 2012. He has been able to achieve this by clearing all the 5 subjects in his first attempt.

The NIOS congratulates this successful learner and wishes him a very bright future!



## NIOS Learners invited to formulate the Odisha State Youth Policy

A state level consultation for formation of Odisha Youth Policy was organised on 17 February 2013 in the conference hall, Campus 3 of KIIT University, Bhubaneswar with the aim to formulate Youth Policy 2013 by consulting across various thematic areas and education as one of the core area from the grass root level concerning Youth Development. Funded by UNFPA, the programme was a joint effort of Govt. of Odisha, the Department of Sports and Youth Services Govt. of India and UNFPA.

A delegation of four NIOS learners from the Bhubaneswar Region comprising Ms. Ankita, Ms. Anuradha, Mr. Nayan and Mr. Papuni along with Mr. R.K. Rath Regional Director, Regional Centre, NIOS, Bhubaneswar attended the programme.

The chief guest of the programme was Ms. Nita Chaudhary (IAS) Secretary, Ministry of Youth Affairs & Sports, Government of India Dr. D.V.Swami (IAS) Director, Sports & Youth Services Govt. of Odisha, Dr. Prabhakanta (IRS), Nehru Yuva Kendra Sagathan, Dr. Hemant Dwivedi UNFPA, Dr. Achyuta Samata, Founder KIIT & KISS were some of the important guests who participated in the programme. The lamp was

lit accompanied by the prayer "Sarve Samno Janani Bharat Dharani Kalpalateyam" sung by the KISSians for invoking a hope of peaceful and successful programme.

The delegates were then divided into two groups. One of groups was constituted on the basis students opting for university education and the second group was of those opting for vocational education. Each group was again divided into eight to nine sub groups with 5-6 students in each sub group.

Each group was given 9 issues concerning youth along with 8-9 problems related to each issue. The groups were asked to discuss on these issues amongst them and make a presentation of their discussion regarding possible solutions to each problem. NIOS delegates participated in the groups discussing Vocational Education.

Each group nominated two representatives from their group who went to put forward their respective opinions and solutions, This was followed by a debate and cross questioning in a plenary session. Finally the program ended with exchange of contact details and an optimistic hope of making a positive contribution.



## Some Suggestive Guidelines for Contributing Articles in Open Learning Magazine (OLM)

The main purpose of the guidelines is to assist and facilitate the writers in writing articles which are relevant to the NIOS learners and qualitatively superb. The magazine is mainly addressed to the NIOS learners who have a different profile than those regular and full time students of public schools. The 'Open Learning' Magazine includes articles which create awareness of our cultural heritage, socio-economic development, environment, global warming, pollution, science and technology, industrialization, globalization, and other fields and such other material that will prepare the learners both for life and career. Besides helping the learners in their academic growth, the articles included in the magazine provide them avenues for broad based learning and supplement their course material. Some times the articles may not be directly related to their academic pursuits but broaden their vision.

### **Some Suggestive Areas/Topics: Societal/Developmental/Health Etc. Concerns:**

- Democracy: Constitutional Obligations, Rights and Duties, Egalitarianism, Democratic way of Living, Non-violence.
- Secularism: Religious Tolerance, Unity, National Integration.
- Social Justice: Gender Party, Removal of Social and Economic Disparities, Women Empowerment.
- Social Reforms: Eradication of Social evils like dowry, child marriage, child labour, female foeticide etc.,
- Environmental Concerns: Global Warming, Pollution, Conservation of Natural Resources, Our forest, Minerals, Water, Animal Wealth, Sea Wealth, Petroleum, Natural Gas.
- Energy: Sources of Energy, Use of Renewable Sources of Energy
- Modernization: Industrialisation. Use of Modern Practices in Agriculture, Small Scale/ Cottage Industries, Employment Avenues, Self Employment, Entrepreneurship, Cooperatives, Self Help Groups.
- Population and Development Education: Adolescence, Life Skills, Safety from Aids/ HIV, Concern for Disabled and Aged, Drugs Addiction. Alcoholism (Substance Abuse), Venereal Diseases.
- Health and Environment Sanitation: Food, Water, Nutrition, Common/Communicable Diseases, Immunization, Community Health, Health Services, Mother and Child Care.
- Human Rights: Universal Declaration of Human Rights 1948, Freedom, World Peace, Non-violence, Dignity and Justice for All, Redressal of Grievances, Infringement of Human Rights, Legal Awareness, Right to Information (RTI), Right of Education.
- Consumer Education: Consumer Awareness - Consumer Rights, ISI, ISO, Hall Mark, Consumer Courts.
- Globalization: World Economy, MNCs Market Economy, Knowledge Economy, WTO, Patenting, Privatization, Liberalization - Impact on Education and Vocational Education and Training.
- Disaster Management.

### Curriculum And Instructional Material Concerns:

- Subject specific Topics to supplement the knowledge of students of Secondary and Senior Secondary levels.
- Constitution of India and of some other countries - Preamble, Right and Duties, Government organs, Panchayati Raj Institutions, Constitutional Amendments - Education as Fundamental Right.
- Rural Development - Development Schemes of the Government - Subsidies, Land Reforms, Banking.
- Literature - Poet Laureate, Noble Laureate, Litterateur, Art, Dance, Drama, Music
- Vocational Education and Training, Vocational Guidance, Career Planning, Skill Development (Hunar) Courses specially for disadvantaged groups such as Minority Women and Young Girls.
- Cultural Heritage - Moral and Ethical Values, Professional ethics. National Monuments.
- Live of Great Men, Noble Prize Winner, Scientists, Mathematicians
- International Institution's - UNO, UNESCO, UNICEF, UNDP, UNFPA World Bank, ILO etc.
- World Peace, International understanding, universal Brotherhood, Non-violence etc.
- Scientific and Technological Advancement - Use of Science and Technology in Everyday life, Information and Communication Technologies (ICT) - Use and Impact on Educational System/Practices, Open and Distance Learning Mode-Teaching Aids, Media Support-Educational Technology, e-learning.

- Biotechnology
- Genetic Engineering
- Nano Technology
- Life Enrichment programmes-Creativity, Art of Living
- Student Support Services in Open and Distance Learning System.
- Educational Reforms.
- Time Management.
- Building Confidence, Self-esteem
- Development Good Study Habits
- Goal Setting
- How to Prepare for Examination Without Stress

The above mentioned concerns are exemplary only, not exhaustive.

### Manuscripts

- (i) The manuscript may be about 2000 to 2500 words.
- (ii) An honorarium of Rs. 1000/- (Rs. One Thousand Only) is admissible for the article accepted in the 'Open Learning' Magazine.
- (iii) The Magazine contains articles in English and in Hindi.
- (iv) The manuscripts may preferably be submitted in typed form with proper spacing along with the C.D. or through e-mail alongwith the soft copy.
- (v) The physical appearance of the manuscript enhances its effect or detract from it. A well prepared manuscripts looks professional to the editors and reviewers and influences their decision in a positive manner.

- (vi) A properly prepared manuscript facilitates the work of the editor and type setter, minimize the possibilities of errors and is more accurate.
- (vii) In view of the nature of the clientele groups, the articles are expected to be easily comprehensible and interactive, promoting positive thinking in readers.
- (viii) The language should be simple aiming at communicating with the reader effectively and with precision.
- (ix) Precision in expression has an economic dimension. Economy is achieved by saying just what needs to be said-nothing more, nothing less.
- (x) Sketch, diagram (s), photographs (s) etc., to enhance better understanding of the topics may be attached. However, no extra payment is admissible for these items.
- (xi) If certain facts and figures, statistics etc., have been taken from elsewhere, the sources may invariably be mentioned suitably in the text/foot note.
- (xii) List of suggested books/material for further reading may be given in the end of the article.
- (xiii) A declaration that this article is original and has not been published in any other journal/magazine should be given in the covering letter.
- (xiv) The covering letter should have the title of the article in full, complete postal address with PIN code, telephone, fax, e-mail, list of enclosures and a brief introduction of the writer may be written.
- (xv) If more than one writers are involved, the covering letter should be signed by all.
- (xvi) The views expressed in the articles included in the 'Open Learning' magazine are those of the writers and the National Institute of Open Schooling is in no way responsible for their views.
- (xviii) Some modifications by way of language editing, organization and presentation of the contents in the articles may be done by the National Institute of Open Schooling.

# Awards Won by NIOS

Several projects have been implemented by the NIOS to tap the potential of Information and Communication Technology (ICT) for promoting of Open and Distance Learning (ODL) system. The Ni-On project of NIOS won the National Award for e-governance and Department of Information and Technology, Govt. of India. In further recognition of its On-line initiatives and best ICT practices, the NIOS received the following awards:

## NIOS WINS National Award for e-Governance 2008-09

Silver icon for Excellence in Government Process Re-engineering, Instituted by Government of India Department of Administrative Reforms and Public Grievances & Department of Information Technology.



## NIOS receives NCPEDP MPHASIS Universal Design Awards 2012



National Institute of Open Schooling (NIOS) has been awarded THE NCPEDP - MPHASIS UNIVERSAL DESIGN AWARDS 2012 instituted by National Centre for Promotion of Employment for Disabled People. The award was given by **Sh. Mukul Wasnik, Hon'ble Minister for Social Justice and Empowerment, Govt. of India** on 14th August, 2012. NIOS has been selected for its remarkable work done for the learners with disabilities through ICT by making its web portal

[www.nios.ac.in](http://www.nios.ac.in) completely accessible for such learners.

## The Manthan Award South Asia & Asia Pacific 2012

The Manthan Award South Asia & Asia Pacific 2012 to recognize the best ICT practices in e-Content and Creativity instituted by Digital Empowerment Foundation in partnership with World Summit Award, Department of Information Technology, Govt. of India, and various other stakeholders like civil society members, media and other similar organisations engaged in promoting digital content inclusiveness in the whole of South Asian & Asia Pacific nation states for development. The award was conferred during **9th Manthan Award Gala South Asia & Asia Pacific 2012 at India Habitat Centre on 1st Dec. 2012.**



## भारत का संविधान

### भाग 4अ

# नागरिकों के मूल कर्तव्य

#### अनुच्छेद 51 अ

मूल कर्तव्य—भारत के प्रत्येक नागरिक का यह कर्तव्य होगा कि वह—

- (क) संविधान का पालन करे और उसके आदर्शों, प्रतिष्ठापित नीतियों, राष्ट्रध्वज और राष्ट्रगान का आदर करे,
- (ख) स्वतंत्रता के लिए हमारे राष्ट्रीय आंदोलन को प्रेरित करने वाले उच्च आदर्शों को हृदय में सँजोए रखे और उनका पालन करे,
- (ग) भारत की संप्रभुता, एकता और अखंडता की रक्षा करे और उसे अक्षुण्ण बनाए रखे,
- (घ) देश की रक्षा करे और आह्वान किए जाने पर राष्ट्र की सेवा करे,
- (ङ) भारत के सभी लोगों में समरसता और समान भ्रातृत्व की भावना का निर्माण करे जो धर्म, भाषा और प्रदेश या वर्ग पर आधारित सभी भेदभावों से परे हो, ऐसी प्रथाओं का त्याग करे जो महिलाओं के सम्मान के विरुद्ध हो,
- (च) हमारी सामाजिक संस्कृति की गौरवशाली परंपरा का महत्व समझे और उसका परिरक्षण करे,
- (छ) प्राकृतिक पर्यावरण की, जिसके अंतर्गत वन, झील, नदी और वन्य जीव हैं, रक्षा करे और उसका संवर्धन करे तथा प्राणिमात्र के प्रति दयाभाव रखे,
- (ज) वैज्ञानिक दृष्टिकोण, मानववाद और ज्ञानार्जन तथा सुधार की भावना का विकास करे,
- (झ) सार्वजनिक संपत्ति को सुरक्षित रखे और हिंसा से दूर रहे, और
- (ञ) व्यक्तिगत और सामूहिक गतिविधियों के सभी क्षेत्रों में उत्कर्ष की ओर बढ़ने का सतत प्रयास करे, जिससे राष्ट्र निरंतर बढ़ते हुए प्रयत्न और उपलब्धि की नई ऊँचाईयों को छू सके।

## Constitution of India

### Chapter IVA

# Fundamental Duties of Citizens

#### Article 51A

**Fundamental Duties - It shall be duty of every citizen of India-**

- (a) to abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) to cherish and follow the noble ideas which inspired our national struggle for freedom;
- (c) to uphold and protect the sovereignty, unity and integrity of India;
- (d) to defend the country and render national service when called upon to do so;
- (e) to promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) to value and preserve the rich heritage of our composite culture;
- (g) to protect and improve the natural environment including forests, lakes, rivers, wild life and to have compassion for living creatures;
- (h) to develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) to safeguard public property and to abjure violence;and
- (j) to strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement.





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