

# DST-INSPIRE INTERNSHIP SCIENCE CAMP - 2012



Department of Science & Technology  
Govt. of India

*In association with*



Jagadis Bose National Science Talent Search  
Govt. of West Bengal

**Science Camp Entitled:**

**“নবরূপে বিজ্ঞান”**

**August 22 – 26, 2012**

**At JB Centre of Excellence for Student – Scientists**



**Jagadis Bose National Science Talent Search,**

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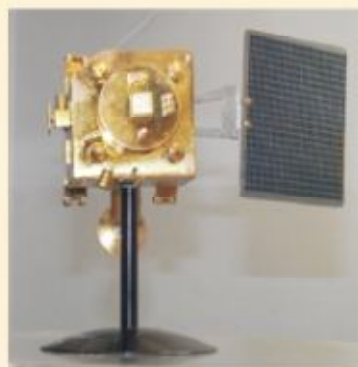
## “নবরূপে বিজ্ঞান”

### **About JBNSTS**

Jagadis Bose National Science Talent Search (JBNSTS), Kolkata was conceptualized in 1958 by visionaries such as Dr. B C Roy, Sir J J Ghandy and others to commemorate the Birth Centenary Celebration of India's first modern scientist, Acharya J C Bose. The program was inaugurated by Pandit Jawaharlal Nehru. JBNSTS is an autonomous institute promoted by the Department of Higher Education, Government of West Bengal. It is administered by a Governing Body with representatives from the State Government, academia and industry. Since 1961, JBNSTS is awarding the prestigious Jagadis Bose Scholarships to selected group of undergraduate students of science, engineering and medicine.



In the last five decades, JBNSTS has grown to become a premiere institute of non-formal science education in the eastern and northeastern States of India with the objective towards pursuit of excellence through motivation, identification and nurture of young talented science students. It helps students to realize the importance of excellence in the scientific world and try to cultivate this in their own lives as students of science. JBNSTS also encourages students towards the learning of basic sciences and inculcates scientific spirit in the minds of young high school and undergraduate students. Focus has been given on unconventional and dynamic methods of non-formal accelerated learning through “out-of-class” activities, which have led to the recognition of intellectually sensitive and inquisitive minds. Since 2004, JBNSTS has launched an innovative middle school science Teachers Training Program which has brought into its ambit motivated teachers from the districts of West Bengal. JBNSTS has developed science kits and distributed to the teachers for demonstrating scientific principles to the middle school students in the classroom. The financial support for most of the activities of



JBNSTS is provided by the Department of Higher Education & Department of Science & Technology, Government of West Bengal. In addition, Council of Scientific & Industrial Research (CSIR), Department of Science & Technology (DST), Government of India & Industries also collaborates with JBNSTS activities.

### **About DST-INSPIRE Program**

Innovation in Science Pursuit for Inspired REsearch (INSPIRE) is an innovative programme being implemented by the Department of Science and Technology (DST), Govt. of India. The basic objective of INSPIRE is to communicate to the youth of the country the excitement of creative pursuit of science, attract talent to the study of science at an early age and thus build the required critical human resource pool for strengthening and expanding the Science & Technology System and Research & Development base. Under the INSPIRE project ‘Scheme for Early Attraction of Talents for Science’ (SEATS) is a program to inspire talented Science students (*top 1% performers in class-X board examination*) into basic science streams.



A striking feature of the programme is that it does not believe in conducting competitive exams for identification of talent at any level. It believes in and relies on the efficacy of the existing educational structure for identification of talent and builds on opportunities that can be derived within the systems.

Science camps are a great way for children to explore the principles and methods of scientific research and strive to get young people interested in science at an early age. They are based on concepts of facilitated self-learning, holistic education, group activities, exchange of cross-cultural ideas, motivation towards independent thought and action and forming life-long friendships with similar minded people and established scientists. Leadership, passion and appreciation of the nature around us are invaluable characteristics for future scientists, and the Science Camp activities strive to encourage these traits.





## Organizing Committee

### Academic Committee:

Prof. (Dr.) Papiya Nandy, Hony. Director, JBNSTS  
Dr. Paromita Roy, Dy. Director, JBNSTS  
Dr. Abhijit Kar, Scientific Officer, JBNSTS  
Dr. Smarajit Manna, Student Advisor, JBNSTS

### Camp Coordinators:

Shri Joydip Das, Asst. Director (admin), JBNSTS  
Ms. Sucharita Kundu  
Shri Prasenjit Chakraborty



### Mentors

#### Dr. Kunal Ray

Senior Principal Scientist  
Molecular & Human Genetics Division at  
Indian Institute of Chemical Biology, Kolkata

#### Dr. Bhupati Chakrabarti

Associate Professor & Head,  
Dept of Physics City College (Main)

#### Dr. Anjan Ghosh

Vice President,  
Total Quality Management,  
Exide Industries Ltd

#### Dr. Ashesh Nandy

Centre for Interdisciplinary Research  
& Education, Kolkata

#### Dr. Soumitra Sengupta

Dept. of Theoretical Physics,  
IACS, Kolkata

#### Dr. Bichitra Kumar Guha

Professor & Dean  
Faculty of Basic & Applied Science  
Bengal Engineering and  
Science University, Shibpur, Howrah

#### Dr. Partha Deb Ghosh

Professor, Dept. of Botany,  
Kalyani University, Nadia

#### Dr. Subhrangsu Aditya

School of Bio Science &  
Engineering and School of Cognitive Science  
Jadavpur University, Kolkata

#### Dr. Paromita Roy

Deputy Director, JBNSTS, Kolkata

#### Dr. Mahan Maharaj

School of Mathematical Science  
RKM Vivekananda University

#### Dr. Panchanan Pramanik

Professor  
Department of Chemistry  
IIT, Kharagpur

#### Dr. Dilip Kumar Maity

Dept. of Chemistry, Bhaba Atomic  
Research Center (BARC),  
Trombay, Mumbai

#### Dr. B. B. Bhattacharya

SNBNCBS, Kolkata

#### Dr. Sibaji Raha

Director, Bose Institute, Kolkata

## CAMP RULES

### Welcome to the Science Camp “নবরূপে বিজ্ঞান”

Here you will have a unique experience of learning science through active interaction with great scientists and be encouraged to share your ideas with others. No test/grade – only learning science in a different way.

### Please note the following points carefully:

- The camp hours are from **09:30 a.m. to 8:00 p.m.** Evening sessions are not mandatory for non-residential candidates. In order to get Participation Certificate, you are required to attend all the sessions. You are to come in your school uniform.
- You are required to submit an attested copy of your X<sup>th</sup> Standard Board Examination Mark Sheet, held in 2012, during the morning registration on **23<sup>rd</sup> August, 2012** at registration desk.
- You are required to fill up the **STUDENT'S INFORMATION SHEET & FEED BACK SHEET** and submit it on **26<sup>th</sup> August, 2012**.
- TRAVEL BILL :**  
Residential Students & Accompanying Teachers: Travel bills (bus, auto and / or train fare only) are to be submitted along with relevant documents (tickets) on **22<sup>nd</sup> August, 2012** by the escorting teachers. Your reimbursement will be made on the **same day**. In case, any assistance / clarification are needed, you may contact our accounts section.  
Non-residential Students: Travel bills (bus, auto and / or train fare only) are to be submitted on **24<sup>th</sup> August, 2012** during morning registration at registration desk. Your reimbursement will be made on **26<sup>th</sup> August, 2012 between 01.30 p.m. to 02.00 p.m.**
- BOOKGRANT :** You will get a bookgrant of Rs. 1,500/-. For that you have to purchase books and submit the bills at JBNSTS office :-  
Residential Students: Book bill(s), authorized by respective Headmaster/ Headmistress, are to be submitted on **24<sup>th</sup> August, 2012** during morning registration at registration desk. Your reimbursement will be made on **the same day**.  
Non-residential Students: Book bill(s), authorized by respective Headmaster/ Headmistress, are to be submitted on **24<sup>th</sup> August, 2012** during morning registration at registration desk. Your reimbursement will be made on **26<sup>th</sup> August, 2012 between 01.30 p.m. to 02.00 p.m.**
- All the participants will be divided into groups. There will be a group leader for each group *selected by group members of each group*. On **26<sup>th</sup> August, 2012**, there will be a session for Project Presentation by the participating students. Each group has to prepare a scientific project on construction of a creative question of their choice (Details are given in Annexure I) and will have to present in front of the judges bench (Power-point /chalk & talk) during **02:00 p.m. – 05:00 p.m.** on that day. Each group will get 10 minutes for presentation and 5 minutes for discussions.
- You will not be given any home work, but you are expected to interact freely with the experts, your group members and other groups. There are evening sessions for project preparation. Non-residential students may attend those sessions if they want.  
On the last day i.e. **26<sup>th</sup> August 2012** you will receive the Participation Certificate.

### Name of the participating schools:

- Kamala Girls High School, Kolkata
- Barasat MGM High School, 24 Pgs (N)
- Sakhawat Memorial Govt. Girls' High School, Kolkata
- DumDum Kishore Bharati, Kolkata



- Baruipur High School, 24 Pgs. (S)
- Krishnanagar Collegiate School, Nadia
- Krishnanagar High School, Nadia
- Chakdah Ramlal Academy, Nadia
- Bethuadahari, J. C. M. High School, Nadia



## BRIEF INTRODUCTION TO THE EXPERTS

### **DR. PAPIYA NANDY**

Dr. Papiya Nandy received her Masters degrees in Physics from University of Calcutta and University of California at Santa Barbara and Ph.D. on Liquid Crystals from Kent State University, USA. Her post-doctoral work was in Experimental Biophysics from Max Planck Institute, Gottingen, Germany. Later she was Associate Professor of Physics in University of Ulm, Germany. She joined Physics department in Jadavpur University and besides teaching for more than 30 years in the Science and Engineering faculties, she was and still is in charge of several research projects. Her field of research encompasses membrane biophysics, numerical analysis of DNA and protein sequences and application of Nanomaterials in ceramics and bio systems. She has more than hundred research publications in peer reviewed journals and 3 patent awards. She has guided several Ph.D. and Masters Thesis. She is currently the Emeritus Fellow of Jadavpur University and the Hony. Director of JBNSTS, of which she is a scholar from the first batch in 1960. Here her objective is to make JBNSTS a vibrant and dynamic institute and to motivate, identify and nurture young talented science students and establish the base of Scientific enquiry and culture of tomorrow.

### **DR. KUNAL RAY**

Dr. Kunal Ray is presently a Senior Principal Scientist in Molecular & Human Genetics Division at Indian Institute of Chemical Biology, Kolkata. He did his Ph.D. from Calcutta University in 1981. His current research interest lies on Molecular bases of genetic diseases which include: Eye diseases (Glaucoma, Oculocutaneous, Albinism), Neurological disorder (Wilson's & Parkinson's Disease), Bleeding disorder (Haemophilia), Genome variation in Indian population, Genetic basis of Arsenic toxicity. His several research papers published in national and international journals.

### **DR. BHUPATI CHAKRABARTI**

Dr. Bhupati Chakrabarti was an NSTS scholar and got his Ph. D from the University of Calcutta for his experimental research work done in the Indian Association for the Cultivation of Science, Kolkata in 1983. He is teaching at the UG colleges for more than thirty years and is currently an Associate Professor in the Department of Physics, City College, Kolkata. He served as the Head of the Departments of Physics in Chakdaha College, Nadia (from 1981 to 1987) and in City College (from 2003 to 2011). He is actively associated with the training and selection of the students for International Physics Olympiad (IPhO) and Asian Physics Olympiad (APhO). He was the part of the Indian delegation to 36<sup>th</sup> IPhO in 2005 held at Spain and in 11<sup>th</sup> APhO in 2010 held at Taiwan. He has written more than two hundred popular science articles in Bengali and in English and has been awarded by the Department of Adult Education, Govt of India. He has also been awarded with Jogamaya Basu Smriti Purashkar of Bangiya Bijan Parishad for his writing in Bengali. He is actively involved in the programmes of Indian Association of Physics Teachers (IAPT) and has conducted number science workshops for students of different levels and the teachers. His field of current interest includes development of physics experiments, physics education related issues, science communication and of course teaching. Dr Chakrabarti has published more than forty papers in different peer-reviewed journals and conference proceedings on his fields of interest. He has presented his work in different national and international conferences in India and abroad. He has co authored a book on environment and has co-edited a collection of essays on science both in Bengali.

### **DR. ANJAN GHOSH**

Dr. Anjan Ghosh, a JBNSTS Scholar of 1970, got the Senior Cambridge degree from Calcutta Boys' School in 1969. He did his B.Sc. with Physics honors and B.Tech. in Instrumentation and Electronics Engineering from Jadavpur University and M.B.A. from Indian Institute of Social Welfare and Business Management. Then he turned into science journalism. He was the author of the science column of the Sunday Miscellany supplement of The Statesman. He is presently the Vice President, Total Quality Management, Exide Industries Limited, Kolkata.

### **DR. ASHESH NANDY**

Dr. Ashesh Nandy is currently associated with Center for Interdisciplinary Research and Education, Kolkata. He is a member of the Condensed Matter Physics Research Centre, Jadavpur University. He did his B.Sc. and M.Sc. in Physics from Calcutta University and received his Ph.D. from University of California, Santa Barbara, USA. He was a postdoctoral fellow of Syracuse University, U.S.A, Max plank Institute, Goettingen, Germany. He was associated with the Computer Division of Lipton India Ltd and IICB, Kolkata, School of Environmental Sc., Jadavpur University as Visiting Scientist. He was a recipient of several scholarships: Earle C Anthony Fellowship from University of California, Max Plank institute fellowship and is a JBNSTS scholar of first batch. His current research interest focuses on bioinformatics.



**DR. SOUMITRA SENGUPTA**

Dr. Soumitra Sengupta is presently a Sr. Professor of the Department of Theoretical Physics, Indian Association for the Cultivation of Science, Kolkata. He did his B.Sc. from Presidency College, M.Sc. from Calcutta University and Ph.D. from Saha Institute of Nuclear Physics, Kolkata. His academic career includes several distinguished positions such as Sr. Lecturer in the department of Physics, Presidency College, Sr. Lecturer & Reader in the department of Physics, Jadavpur University, Reader, Professor and Sr. Professor, Department of Theoretical Physics, IACS. He is a fellow of The National Academy of Sciences, India. His Current Research Interest includes String Theory, Supersymmetry, Supergravity, Braneworld Phenomenology, Cosmology and Black holes.

**DR. BICHITRA KUMAR GUHA**

Dr. B.K. Guha, Dean of the Faculty of Basic and Applied Sciences, Bengal Engineering and Science University has been a topper throughout his academic carrier. As a student of Presidency College, he topped the B. Sc (hons) Examination and has been a recipient of Gold Medal from the Calcutta University. He did his M.Sc. and M. Phil from Delhi University and Ph.D. from Calcutta University. His main area of research is Electronic Ceramic Materials. His original work on development of the technology for chemical processing of ferroelectric materials has been acclaimed all over the globe. He has a number of research publications and books to his credit and is guiding several students leading to Ph.D. Degree.

**DR. PARTHA DEB GHOSH**

Dr. Partha Deb Ghosh is Professor of Botany at the Department of Botany, University of Kalyani, West Bengal and worked in the field of plant genetics and Biotechnology. He has done extensive work on in vitro culture, genetic transformation of plants, molecular markers and supervised research of Masters and Doctoral students. He has published 3 books/ manuals on plant genetics and biotechnological aspects and published more than 270 research papers in different national and international journals. Dr. Ghosh has availed fellowship offered by UGC Indo-Uk exchange programme (1977-78), DST young scientist awards (1984), DBT training programme. He is fellow of Linnean society (London), association of plant tissue culture and biotechnology (India). Dr. Ghosh has awarded INSA gold medal for outstanding contribution of plant tissue culture and mutation research, life time achievement award by DST and honoured by different universities.

**DR. SUBHRANGSU ADITYA**

Subhrangsu Aditya, M.B.B.S., senior JBNSTS scholar (1995) is currently pursuing his research at School of Bio Science & Engineering, Jadavpur University. Besides, he is associated with School of Cognitive Science (formerly Center of Cognitive Science), Jadavpur University as a research assistant and guest faculty for the M. Phil. course in Cognitive Science. He is also associated with various workshops, seminars and other activities conducted by Center for Counselling and Studies in Self-Development Skills, Jadavpur University (CCSSS-JU). He is an associate member of SAMIKSHANI Centre for Psychoanalytical Studies and Mental Therapy (since 2009). He has publications in various international journals (such as *International Journal of Artificial Intelligence and Soft Computing*, 2012; *International Journal of Computational Vision and Robotics*, 2009) and conference proceedings (such as *2010 IEEE Students' Technology Symposium*; *International Joint Conference on Artificial Intelligence: IJCAI-07*, 2007; *International Workshop on Spatial Issues in Language and Vision: SLIV-05*, 2005) and book chapters (such as "Ethical Issues in Mental Health Services from Consumers' Perspective" published in the book *Ethical Issues in Mental Health Services*, 2009; "Determinants of Perception: A Neurophysiological Perspective" published in the book *Determinants of Perception*, 2009). He participated as a resource person in the UGC Sponsored Refresher Course "Art and Science of Mechatronics and its Application in Robotics" held at Electrical Engineering Department, Jadavpur University. He was invited to present a paper entitled "Protecting Children in Cyberspace" presented at the *Institute of Engineers (India)*, West Bengal State Centre, on the *World Telecommunication and Information Society Day*, May 17, 2009. His current areas of interest are Cognitive Neuroscience, Artificial Intelligence, Bio signal processing, Psychological Counselling, Stress Management, Cyber-relationship, Jealousy etc.

**DR. SOMSUBHRA PAL**

Dr. Somsubhra Pal is presently a house physician in Department of Physical Medicine and Rehabilitation (for crippled children) in Dr. B. C. Roy Polio Hospital, Beliaghata, Kolkata. He has completed his M.B.B.S (W.B.U.H.S) in 2012 with 1<sup>st</sup> Class. He received JBNSTS Senior Scholarship Award in 2006 and also winner of many other quizzes and contests.



## “नवरूपे विज्ञान”

### DR. PAROMITA ROY

Dr. Paromita Roy did her Bachelors in Psychology (with special paper in family counseling), as well as in Masters in Industrial Psychology and Organizational Behavior from Delhi University. She received her PhD from Delhi University in Clinical Psychology and worked in the field of cognitive deficits in schizophrenia from Delhi University. Dr. Roy has extensive field experience in the area of clinical psychology. Her expertise is in educational psychology, soft skill training, human resource development, curriculum planning, strategy development, pedagogy, teacher training and student counseling. She has been with JBNSTS since 1993. Her focus is on educational paradigms with a socio-holistic view. With her long experience with creative science students and teachers, she has been instrumental in designing tailor made science enrichment programs.

### DR. MAHAN MAHARAJ

Dr. Mahan Maharaj, a renowned mathematician, did his M.Sc. (Int.) from IIT, Kanpur, Ph.D. from UC Barkley under the advisor Andrew Casson. Presently he is an Associate Professor, Department of School of Mathematical Science, Ramakrishna Mission Vivekananda University, Belur Math. He is the recipient of Shanti Swarup Bhatnagar award in Mathematics.

### DR. P. PRAMANIK

Dr. Panchanan Pramanik is currently a Professor of Chemistry at IIT, Kharagpur. He did his Ph. D. from IIT, Kharagpur. His research areas are Nanoscience and Nanotechnology and Material Chemistry. His several research papers published in national and international journals. Dr. Pramanik received Chemical Research Society of India Medal in 2002.

### DR. D.K. MAITY

Dr. Dilip K. Maity is currently a scientist Theoretical Chemistry Section, Chemistry Group, Bhabha Atomic Research Centre, Mumbai and Faculty of National Initiative for Undergraduate Science (NIUS) at Homi Bhabha Centre for Science Education (TIFR). He did his B.Sc. with Chemistry (Hons) from Jadavpur University, M.Sc. (Gold Medalist) with Physical Chemistry as special paper from Jadavpur University and Ph.D. from Indian Association for the Cultivation of Science, Kolkata. Dr. Maity did his Post-doctoral Research from Henry Eyring Centre for Theoretical Chemistry, University of Utah, Salt Lake City, USA. His research area is Spectroscopy (Experimental / Theoretical). Dr. Maity is also associated with Chemistry Olympiad: Selection & Training of Indian Delegation Team for International Chemistry Olympiad since 2002 and he represented India as Head Mentor of Indian Delegation Team for International Chemistry Olympiad in 2007 (Russia) & 2008 (Hungary).

### DR. B. B. BHATTACHARYA

Dr. Bimalendu Bhusan Bhattacharya did his B.Sc. (Physics) and M.Sc. (Geophysics) from Banaras Hindu University and Ph.D (Physico-Mathematical Sciences) from Leningrad State University, USSR (Presently St. Petersburg University, Russia). His some of the major research interests is Geoelectromagnetism, Mining Geophysics, Engineering Geophysics, Environmental Geophysics and Interpretation of Geophysical Data using Nonlinear Inversion, Computer Simulation and Modeling. He has done pioneering work during Indian Antarctica Expedition as leader. He has worked as Scientist in National Geophysical Research Institute (NGRI), Hyderabad and Director in Indian School of Mines (ISM), Dhanbad. Currently he is Emeritus Professor (CSIR Emeritus Scientist) and INAE Distinguished Professor in S. N. Bose National Centre for Basic Sciences, Kolkata. He has worked different parts of the globe and held distinguished positions such as Visiting Professor, Department of Physics in University of Alberta Edmonton, Canada, Leader, Fourth Scientific Indian Antarctica Expedition, Government of India; Visiting Professor (Fulbright) Department of Geology & Geophysics in University of Wisconsin, Madison Wisconsin, USA and Guest Faculty in Bengal Engineering and Science University, Sibpur, Howrah, W.B. Among many distinguished awards, he has got National Mineral Award, Dept. of Mines, Govt. of India, Distinguished Service Award Indian School of Mines, Dr. Coggin Brown Gold Medal on Earth Sciences, MGMI; Decennial Award, Association of Exploration Geophysicists, ect. He is Member of the Editorial Committee of The Journal of Geological Society of India, Recipient of Distinguished Professor's Chair by Indian National Academy of Engineering (INAE).

### DR. SIBAJI RAHA

Dr. Sibaji Raha is presently the Director of Bose Institute, Kolkata. He is the Professor of Physics and received his Ph. D. Degree from University of Texas at Austin, USA. He is the recipient of several awards and honours during his career as a scientist, researcher and a cademician. His present research interest includes High energy particle and nuclear physics, Astrophysics, Cosmology, Quantum field theory, Nonlinear processes.



**Day to Day Program of the Science Camp from August 22- 26, 2012 at JBNSTS Campus**

**Day 1 : Wednesday, August 22, 2012**

10:00 a.m. – 10:30 a.m.	Registration
10:30 a.m. – 11:00 a.m.	Orientation
11:00 a.m. – 11:30 a.m.	Welcome Address by the Director, JBNSTS
11:30 a.m. – 12:30 p.m.	<b>Inaugural Lecture</b> <b>Dr. Kunal Ray</b> , Senior Principal Scientist, Molecular and Human Genetics Division Indian Institute of Chemical Biology, Kolkata
12:30 p.m. – 01:30 p.m.	Lunch & Interaction
01:30 p.m. – 03:30 p.m.	<b>“You Can Also Represent Your Country in the International Physics Olympiad (IPhO)”</b> <b>Dr. Bhupati Chakrabarti</b> , Associate Prof. & Head, Dept of Physics City College
03:30 p.m. – 05:00 p.m.	<b>“Creativity – Learning From Nature”</b> <b>Dr. Anjan Ghosh</b> , Vice President, Total Quality Management, Exide Industries Ltd
06:00 p.m. – 08:00 p.m.	<b>“Process of Science”</b> <b>Dr. Ashesh Nandy</b> , Centre for Interdisciplinary Research & Education, Kolkata

**Day 2 : Thursday, August 23, 2012**

09:30 a.m. – 10:00 a.m.	Registration ( <b>Submission of attested copy of Xth Standard Board Examination Mark Sheet</b> )
10:00 a.m. – 12:00 noon	<b>“The Amazing Story of Higgs-Boson – A Very good (not god) particle”</b> <b>Dr. Soumitra Sengupta</b> , Dept. of Theoretical Physics, IAC S, Kolkata
12:00 noon – 01:30 p.m.	<b>“Evolution of Scientific Ideas”</b> <b>Dr. Bichitra Kumar Guha</b> , Professor & Dean, Faculty of Basic & Applied Science, Bengal Engineering and Science University, Shibpur, Howrah
01:30 p.m. – 02:30 p.m.	Lunch & Interaction
02:30 p.m. – 04:00 p.m.	<b>“Perspectives of Biotechnology and Genomics in Plant Sciences”</b> <b>Dr. Partha Deb Ghosh</b> , Professor, Dept of Botany, Kalyani University, Nadia
04:00 p.m. – 05:30 p.m.	<b>“How to choose your career?”</b> <b>Dr. Subhrangsu Aditya</b> , School of Bio Science & Engineering and School of Cognitive Science, Jadavpur University, Kolkata
06:00 p.m. – 08:00 p.m.	<b>Science Quiz : Dr. Somsubhra Pal</b> , Dr. B. C. Roy Polio Hospital, Beliaghata, Kolkata

**Day 3 : Friday, August 24, 2012**

09:30 a.m. – 10:00 a.m.	Registration ( <b>Submission of travel bill &amp; Book bill</b> )
10:00 a.m. – 01:00 p.m.	<b>“Mathematics Workshop conducted by BITM Team”</b>
01:00 p.m. – 02:00 p.m.	Lunch & Interaction
02:00 p.m. – 5:00 p.m.	<b>Continuation of - “Mathematics Workshop”</b>
06:00 p.m. – 07:30 p.m.	<b>CD Show for participating students &amp; Parent Counseling by Dr. Paromita Roy</b> , Deputy Director, JBNSTS

**Day 4 : Saturday, August 25, 2012**

09:30 a.m. – 10:00 a.m.	Registration
10:00 a.m. – 11:30 a.m.	<b>“Shapes and geometry of surfaces”</b> <b>Dr. Mahan Maharaj</b> , School of Mathematical Science, RKM Vivekananda University
11:30 a.m. – 01:00 p.m.	<b>“Promise of Nano-Science and Nano-Technology in India”</b> <b>Dr. Panchanan Pramanik</b> , Professor, Department of Chemistry, IIT, Kharagpur
01:00 p.m. – 02:00 p.m.	Lunch & Interaction
02:00 p.m. – 05:00 p.m.	<b>“How to follow a chemical reaction?”</b> <b>Dr. Dilip Kumar Maity</b> , Dept. of Chemistry, Bhabha Atomic Research Center (BARC), Trombay, Mumbai
06:00 p.m. – 08:00 p.m.	<b>Project Preparation</b>

**Day 5 : Sunday, August 26, 2012**

09:30 a.m. – 10:00 a.m.	Registration
10:00 a.m. – 11:30 a.m.	<b>“Exploration Antarctica: Science &amp; Adventure”</b> <b>Dr. B. B. Bhattacharya</b> , SNBNCBS, Kolkata
11:30 a.m. – 01:00 p.m.	<b>Valedictory Lecture</b> <b>Dr. Sibaji Raha</b> , Director, Bose Institute, Kolkata
01:00 p.m. – 02:00 p.m.	Lunch & Interaction ( <b>Submission of Information cum Feedback sheet, reimbursement of Travel Bill</b> )
02:00 p.m. – 05:00 p.m.	<b>Project Presentation</b>
05:00 p.m. – 05:30 p.m.	<b>Distribution of Certificates</b>



### Project Presentation Topic at JBNSTS- DST INSPIRE Science Camp, August 22 - 26, 2012

Consider this well known and well accepted statement:

**“The quality of an answer depends largely on the quality of the question asked”.**

From your existing knowledge in the diverse field of science, construct a creative question or problem which your group finds important and the answer to which is not readily available. Follow the suggestions given below.

- 1) The question should be within the general field of sciences
- 2) It should be posed in as clear and unambiguous manner as possible
- 3) It should be suggestive of your group's scientific motivation and logic
- 4) Your question should seem interesting to your peers
- 5) Your group may come up with a probable answer
- 6) Your group may suggest an application, if appropriate

Hint: 1. Your question may arise from the observation of the vast array of natural phenomena that you see occurring around you every day.  
2. Yours can be a mathematical question also!

Examples for guidance:

1. We know due to application of external force, every solid material gets deformed to a new shape and it regains its original shape when the force is withdrawn. If the force is sufficiently large, the material is permanently deformed or broken. The question here is “Why is it broken or permanently deformed after a certain limit of applied force and what is its scientific basis”? In search of the answers to these questions, scientists discovered the material- property known as elasticity.
2. In biological systems we find everything working in an extremely organized and systematic manner. For examples a cell, a tissue, an organ works in a very orderly fashion to perform various work. But natural laws tell us that, to do work, disorderliness (entropy) needs to increase. Does this mean the biological systems do not follow the natural laws?
3. Why is the shape of the candle flame the way it is?

‘কোনো উত্তরের গুণমত মান বেশীরভাগই প্রশ্নের মানের উপর নির্ভর করে’। -এই উক্তিটি বহুল পরিচিত এবং স্বীকৃত।

বিজ্ঞানের বিভিন্ন দিকগুলি সম্পর্কে তোমাদের জ্ঞান থেকে এমন একটি সৃজনশীল (creative) প্রশ্ন বা সমস্যা গঠন করো, যেটি তোমাদের গ্রুপের কাছে খুব গুরুত্বপূর্ণ বলে মনে হয় এবং যে প্রশ্নটির উত্তর সহজলভ্য নয়।

নীচের ইঙ্গিত বা ধারণা গুলি অনুসরণ করো।

- (i) প্রশ্নটি অবশ্যই বিজ্ঞানের সাধারণ ক্ষেত্রগুলির মধ্যে হবে।
- (ii) এটি যথাসম্ভব দ্ব্যর্থহীন এবং পরিষ্কার ভাবে উত্থাপন করতে হবে।
- (iii) এটি অবশ্যই তোমাদের গ্রুপের বৈজ্ঞানিক অনুপ্রেরণা ও যুক্তি থেকে তৈরী হবে।
- (iv) প্রশ্নটি যেন তোমার বন্ধুদের কাছে আকর্ষণীয় হয়।
- (v) প্রশ্নটির সম্ভাব্য উত্তরের কথা ও ভাবতে পারো।
- (vi) প্রশ্নটির সম্ভাব্য কোন ব্যবহারিক দিকের কথাও উল্লেখ করা যেতে পারে।

সংকেত বা ইঙ্গিত :

- (i) তোমাদের চারপাশে প্রতিনিয়ত তোমরা যা দেখছো - এই রকম প্রাকৃতিক ঘটনার সম্ভার থেকেও তোমার প্রশ্ন আসতে পারে।
- (ii) এটি একটি গাণিতিক প্রশ্ন বা সমস্যাও হতে পারে।

উদাহরণ :

1. আমরা জানি, বাহ্যিক বলের ক্রিয়ায় প্রত্যেক কঠিন বস্তুর আকারের পরিবর্তন হয় বল অপসৃত হলে, বস্তু আগের আকার ফিরে পায়। কিন্তু যদি বল যথেষ্ট বেশী পরিমাণের হয় তবে বস্তু স্থায়ী ভাবে বিকৃত হয় অথবা ভেঙে যায়। এখানে প্রশ্নটি হল - ‘একটি নির্দিষ্ট সীমার বেশী বল প্রয়োগে বস্তুর কেন স্থায়ী বিকৃতি ঘটে বা ভাঙন হয়? এবং এর বৈজ্ঞানিক ভিত্তি কি?’ এই প্রশ্নগুলির উত্তর খুঁজতে গিয়ে বিজ্ঞানীরা পদার্থের স্থিতিস্থাপকতা ধর্ম আবিষ্কার করেছিলেন।
2. বায়োলজিক্যাল সিস্টেমে সমস্ত জৈবিক ক্রিয়াগুলি সুসংঘবদ্ধভাবে এবং নির্দিষ্ট নিয়মমাত্রিক সংঘটিত হয়। উদাহরণ স্বরূপ, কোনো কাজ কোষ, কলা এবং কোষাঙ্গগুলি সুশৃঙ্খলভাবে সম্পাদন করে। কিন্তু প্রাকৃতিক নিয়ম অনুযায়ী, কার্য করার সময় এন্ট্রপি বা ডিসঅর্ডারনেস বৃদ্ধি পাওয়া প্রয়োজন। এর থেকে কি বলা যায় - ‘বায়োলজিক্যাল সিস্টেম প্রাকৃতিক নিয়ম মেনে চলে না?’
3. মোমবাতির শিখার আকৃতি ঐ রকম হয় কেন?