



### FROM NSC

Dear Members,

**Wish you all a very Happy & Prosperous New Year.**

Nehru Science Centre has offered new gifts to its esteemed visitors by opening new films for its facilities of **Science Odyssey** and **3D Science Show**. Both of these facilities are very popular and provide out of the world experience for visitors. In order to keep this popularity intact among the science lovers of the city, we shall change these films every year or half wherever possible. The new films titled **Everest** and **Turtle Adventure** respectively for above facilities will provide visitors opportunities to have glimpses of stunning landscapes of two extreme worlds, which are on highest and lowest points on the Earth i.e. Mount Everest and deep in an Ocean. The two would have been launched by the time you will be reading this quarterly news bulletin.

The centre has also opened an exhibition on **Measuring Our Planet** designed & developed by National Council of Science Museums during International Year of Planet Earth. This traveling exhibition portrays human endeavours for measuring various features of Earth, their significance and usefulness as well. It gives you an idea about the shape, size while comparing with number of individuals like us required to measure circumference of Earth. It also tells about age of Earth, speed of its rotation, movement of its plates, magnetic field, radiation received from Sun etc. In a nutshell, the exhibition takes you on a short but captivating journey to assess the planet Earth through measurement of its salient features. It will remain open at NSC for visitors till 20th February 2010. So hurry up!

The 22<sup>nd</sup> Western India Science fair was successfully organised at the Centre during 16<sup>th</sup> -19<sup>th</sup> December 2009 with active supports from Education Departments of Chattishgarh, Goa, Madhya Pradesh, Maharashtra, Department of S&T, Rajasthan and GUJCOST, Gujarat. 37 student projects and 16 teaching aids were on display. Over 15000 people visited the fair this year. Dr. B. G. Kulkarni, Director, The Institute of Science, Mumbai inaugurated the fair while, Prof. Dipan K. Ghosh, Department of Physics, IIT Bombay, Mumbai gave away the prizes to the winners.

During the last quarter the Centre launched the annual inter school science quiz contest for Marathi & English medium schools. The final for Marathi medium was completed in December while for others oral rounds are going on. A workshop for science teachers on 'Technology of Education and Education of Technology' was organised in collaboration with Bombay Association for Science Education. Aviation Day was celebrated in association with Aeronautical Society of India, Mumbai Branch with new added dimension of aero-model display contest.

The Centre celebrated its 24th Anniversary on 11th November 2009. A Popular Science Lecture on the topic 'The Pioneer of Modern Indian Science : Sir Jagdish Chandra Bose' was organized. Dr. Tejaswini Dalvi, Research Associate & Faculty, UM-DAE Centre for Excellence in Basic Sciences, Mumbai delivered the lecture.

We are glad to announce that we have crossed the 8 lakh mark for visitors in this calendar year. Thanks to all the visitors to put science centre on their itinerary for visit. We request you all not to miss the new exhibition & programmes especially during National Science Week in February 2010.

### WHAT'S NEW

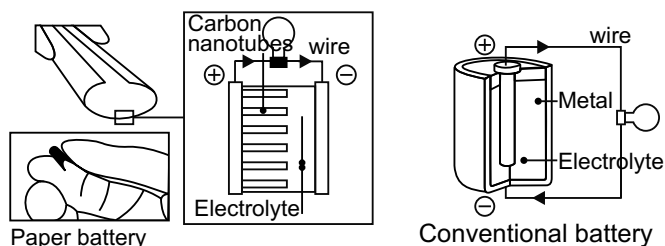
#### Lip-Reading Computers

Lip-reading computers now can detect different languages. A group of scientists at the University of East Anglia (UEA) led by Stephen Cox and Jake Newman of UEA's School of Computing Sciences have created lip-reading computers that can distinguish between different languages. Computers that can read lips are already in development but this is the first time they have been 'taught' to recognize different languages. The discovery could have practical uses for deaf people, for law enforcement agencies, and in noisy environments.

The technology was developed using statistical modeling of the lip motions made by a group of 23 bilingual and trilingual speakers. The system is able to identify the language spoken by an individual speaker with very high accuracy. These languages include English, French, German, Arabic, Mandarin, Cantonese, Italian, Polish and Russian. "This is an exciting advancement in automatic lip-reading technology and the first scientific confirmation of something we already intuitively suspected - that when people speak different languages, they use different mouth shapes in different sequences", said Prof. Cox. "They found frequent 'lip-rounding' among French speakers and more prominent tongue movements among Arabic speakers". Funded by the EPSRC, the research is part of a wider UEA project on automatic lip-reading. The next step will be to make the system more robust to an individual's physiology and one's way of speaking.

#### Paper Battery offers Future Power

A flexible paper battery could meet the energy demands of the next generation of gadgets, says a team of research personnel. They have produced a sample slightly larger than a postage stamp that can store enough energy to illuminate a small light bulb. But the ambition is, to produce reams of paper that could power a car one day. Professor Robert Linhardt of the Rensselaer Polytechnic Institute, New York said that the paper battery is a glimpse into the future of power storage. The team behind the versatile paper, which stores energy like a conventional battery, says it can also double as a capacitor capable of releasing sudden energy bursts for high-power applications. The ambition is to produce the paper battery using a newspaper-type roller printer. While a conventional battery contains a number of separate components, the paper battery integrates all of the battery components in a single structure, making it more energy efficient.



## EXPLORE

### Floating Ball

#### You need

Flexible soda straw, floating ball, piece of thermocole & piece of thin wire.

#### What to do

Take a flexible soda straw. Carefully cut the small end so that there are four small fingers of plastic sticking out. Gently bend these pieces down to make a cradle for the thermocole ball as shown in fig.

Bend the short end of the straw at right angles to the longer piece.

Bend a piece of thin wire as shown below with pliers. Tape the wire loop to the soda straw so that the loop is approximately 2.5 cm above the opening of the straw. Now place the thermocole ball on the top of the straw and blow gently. With practice you should be able to control the ball so that it will rise above the loop and settle back down again into the cradle at the top of the straw. Explore this and try to find scientific principle involved in it.



## CREATIVITY

### Make your own Guitar

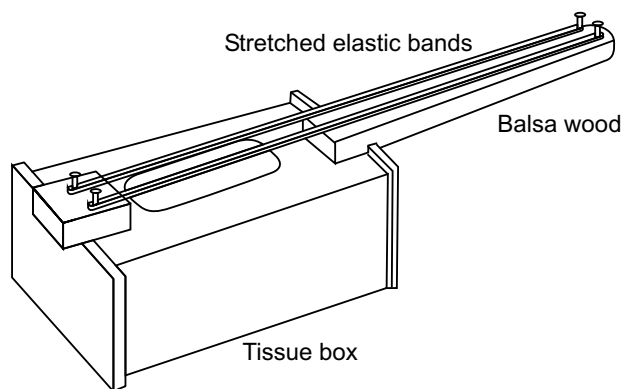
#### You will need:

Long rubber bands of different thickness, empty tissue box, one with an opening in it as shown, two pieces of balsa wood, nails, and colour papers for decoration.

#### What to do?

1. Cut two pieces of balsa wood to match the shapes in the picture.
2. Glue the balsa wood pieces firmly onto the tissue box.
3. Fit the rubber band around the tracks. You may need to strengthen the box by fitting some wood at the ends.
4. Try out rubber bands of different thickness.
5. Decorate your guitar with coloured papers, felt tips or paint.

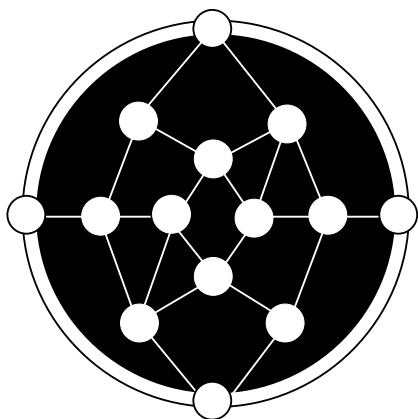
Your own guitar is ready to play.



## TRY YOUR WITS

Can you visit all the fourteen circles within the picture?

(You have to visit in succession along a continuous line, visiting each circle just once and returning to the point from which you started)



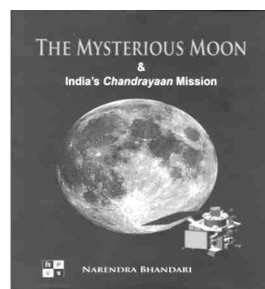
**LAST DATE FOR SENDING YOUR SOLUTION IS FEBRUARY 15, 2010**

Best entry will be suitably awarded.

(Please note that the contest is open to student members up to Std. X only)

## BOOKS WORTH READING IN NSC LIBRARY

### The Mysterious Moon & India's Chandrayaan Mission



This book is an attempt to answer the most complex and fascinating facts about the Moon & its origin. It is written by Prof. Narendra Bhandari, a renowned Indian planetary scientist in Physical Research Laboratory (PRL), Ahmedabad. He has been associated with study of the

Moon since the direct exploration began in 1960's & with the Chandrayaan-I Mission since its inception. He was also part of the Chandrayaan Mission task force constituted by Indian Space Research Organisation. This book is presented in simple language with the motivation for the Mission to Moon in the frame work of the unresolved problems in lunar science. This book traces the Moon's relationship with Earth & its mysteries surrounding its evolution. Prof. Bhandari's simple style of writing would make even a laymen to take interest in understanding the various aspects of the Moon. This book is a very good source of information for not only the general public but also for students who intend to take up Space and Astronomy as career.

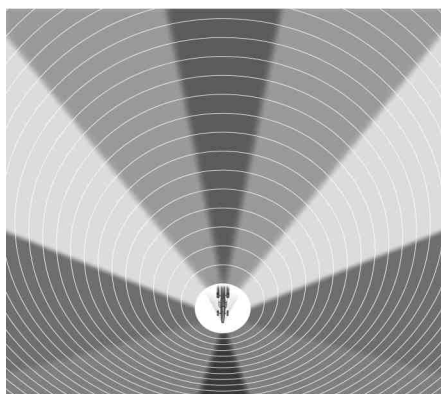
## EXHIBIT TO REMEMBER

### DOPPLER'S EFFECT

You can interact with this exhibit in the very popular 'Sound & Hearing' gallery' of the centre. On pressing a switch you can listen to the changing pitch of the sound as the rotating stick moves in a circle coming closer & going away from you. The Doppler Effect causes the apparent change in the pitch of the sound.

The sound of whistle/siren of approaching or receding trains or ambulances are heard differently. The pitch of approaching vehicle is higher than vehicle moving away. This happens because to an observer sound waves in front of vehicle are being squashed together by moving vehicle. This causes more waves to reach your ear per second resulting in a higher pitched sound. When ambulance moves away from you, the sound becomes lower in pitch as there are fewer waves per second, and a lower pitch sound is heard. This apparent change in frequency is known as "Doppler Effect" after its discoverer, an Austrian Mathematician and Physicist, Christian Doppler(1803-1853).

The blue shift, observance of lower wavelength of approaching light sources and red shift, the observance of higher wavelengths of receding light sources are also due to Doppler effect but in electromagnetic waves. Astronomers use this observation for calculating, precisely, the speed of stars or astronomical objects, as they move toward or away from the Earth.



### Star Facts

- ✎ Copper is mixed with tin to make bronze, an alloy, which dates back more than 5000 years.
- ✎ On a sunny day every second one thousand billion photons fall on a pinhead.
- ✎ One kilogram of Deuterium (an isotope of hydrogen) can give the same amount of energy as three million kilograms of coal.
- ✎ If the DNA molecule in every human body cell were as thick as a hair, it would be 8 km long.

**Members having membership number upto 5300 are requested to ensure their renewals at the earliest.**

## PROGRAMMES AT NSC

### Workshops

Workshop for Teachers /Students on 28th & 29th January 2010.

**National Science Day Celebration:** Various programmes and competitions will be organised for school/college students and teachers.

**Science Drama Festival (Zonal level):** Only State/UT level winners of West zone will participate.

**Film Festival:** Selected science films will be screened in the centre's auditorium for the organized school groups subjected to their prior bookings.

**Solar Eclipse Viewing:** 15th Jan 2010 from 10.30 am to 3.00 pm

For further details on programmes/activities at NSC please contact reception counter or on telephone nos 24920482, 24932667 or visit our website at [www.nehrusciencecentre.org](http://www.nehrusciencecentre.org)

## INDIAN SCIENTIST

### Dr. Thanu Padmanabhan

Dr. Thanu Padmanabhan was born on 10th March 1957, at Thiruvananthapuram in Kerala State of India.



He is a distinguished Professor in theoretical physics. He is currently working at Inter University Centre for Astronomy and Astrophysics (IUCAA) at Pune. Dr Padmanabhan completed his schooling in Thiruvananthapuram, Kerala and B. Sc. (1977) & M.Sc (1979) in Physics from University College, Kerala University, securing Gold Medals for his academic

brilliance. He published his first research paper, when he was a B.Sc. student, at the age of 20. He joined Tata Institute of Fundamental Research (TIFR), Mumbai for Ph. D. and became a faculty member there in 1980. Dr. Padmanabhan has worked in several contemporary areas of theoretical physics like quantum cosmology, structure formation in the universe, statistical mechanics of gravitating systems, black holes and quantum gravity. He has published nearly 200 papers in leading national & international journals. His current research interest is in understanding the nature of dark energy in the universe and its implications for quantum gravity. He has developed a new, holographic perspective on Gravity which has the potential of resolving some of the difficult problems in quantum gravity. Padmanabhan has received several national and international awards. His work has won awards from the Gravity Research Foundation, USA five times, in 1984, 2002, 2003, 2006 and 2008. He is an elected Fellow of the three National Academies of Science in India. He was awarded the Padma Shri India's fourth highest civilian honour in the year 2007.

## HOW IT WORKS

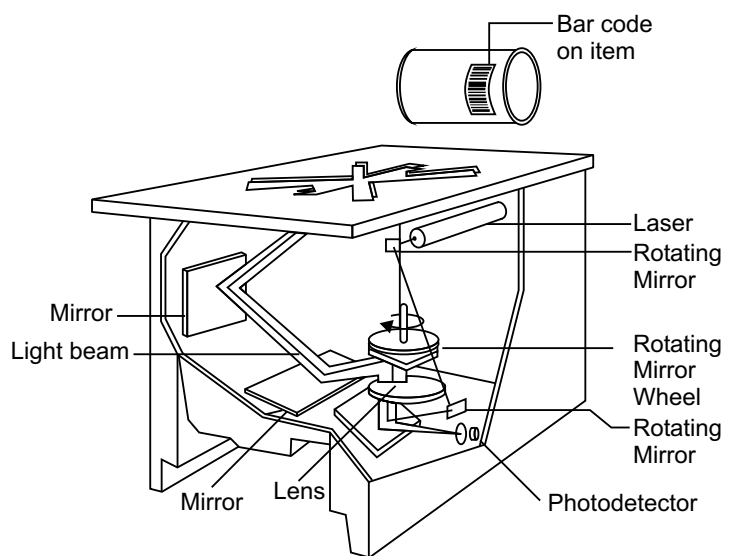
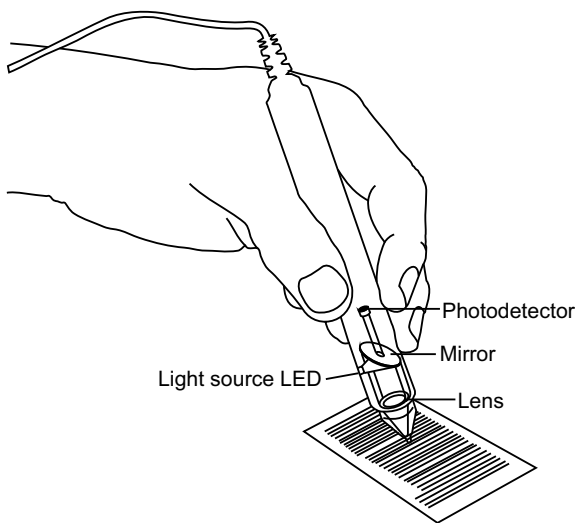
### How does the Bar Code reader work?

A bar code is a rectangular block of black and white lines often seen printed on cans of food, books & many other items. The dark lines and white spaces of different width tell a computer what the item is and how much the item costs.

The information in the bar code is passed to a computer by a bar code reader. First a small beam of light is moved across the bar code, the dark lines in the code reflect less light than the white spaces, so the light reflected off the code varies in the brightness. The reader converts the changes in brightness of the reflected light into an electrical signal. Finally the signal is sent to a computer.

**Left :** Some bar code readers look like pens. Inside the pen, there is a source of light called a light-emitting diode (LED). The light from the LED is reflected through a lens onto the bar code as the pen moves over it. The light reflected from the code falls on a photodetector which produces an electrical signal. The signal is then passed to a computer.

**Right :** Inside a supermarket checkout table, a laser beam is reflected by two small rotating mirrors and a larger rotating mirror wheel. The pattern of beams produced is almost certain to fall on the bar code on packages held above the table. The reflected beam is directed by the mirrors through the lens to the photodetector, which turns it into an electrical signal in usual way.



### Laugh- line

### E-waste disposal !!!

CPU, Monitor,  
Keyboard, Mouse,  
Speaker, Switches  
.....wala.....a.....

