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The Blue Planet

The Earth, third planet from the Sun, is the only planet on which life blooms. The life originated on this planet with very few simple organisms and with the passage of time through the process of selection evolved into an amazingly large variety of microorganisms, plant and animals – The biodiversity. Life on Earth sustains on a critical balance in which all the living organisms directly or indirectly are the support system for each other. Human beings, as part of this biodiversity occupy the same horizontal level as any other organisms, though he considers himself to be above it.

Since the beginning of the evolution, living organisms have extraordinarily capability of adaptation to match geological, climatic and other change. Human beings also showed similar capability of adaptation after their appearance as a new species. For example, Eskimos living in the Arctic, developed short, stocky bodies, the shape that tends to retain heat. On the other hand, Indians in the Amazonian rain forest have hairless bodies and long thin limbs so that their body tends to loose heat. People who lived in a region with fierce sunshine, have dark pigmentation in their skins to protect their bodies, whereas those living in cloudier, cooler regions with feeble sunshine have less pigment and pale skins to promote the production of vitamins in their body.

Around 12,000 years ago, human being began to show a new talent. When faced with harsh surrounding they began changing them. They began to modify the land in which they lived and the animals and plants on which they were depended.

The animal, which first became closer to human civilization, was dog, the modified form of wolf. Wolves fed on the remains of the hunt of human hunters, picking up unwanted offal. Maybe, things sometimes worked in the other way also where a pack of wolves might make a kill and the human hunters claim some of it. Eventually, the two species came to form an alliance. About the same time human being were bringing wild animals and plants

under their control. These new versions of plants and animals slowly spread from settlement to settlement across the Middle East and Europe, and slowly these practices started bringing change in entire human civilization. Man began to cut down the forests, using stone axes to make room for their settlements, to provide grazing fields for their livestock and crop cultivation.

Over the centuries, the pace of development has accelerated. The rapid modernization has become the key source for development of society. In the pursuit of growth and development, human beings began exploiting nature. The mass deforestation followed by loss of top soil, landslides, and change in climatic patterns has disturbed the delicate balance of Earth. As a result, the interdependence of various systems and the natural resources was severely disturbed which also coupled with extinction of several species of plants and animals. Every day around 100 different species of animal and plants are lost forever and if this trend continues then before next century around 60000 different plants varieties will extinct.

We have to realize that if we continue our development the way we have been doing now, we may have to face the revenge of the nature. It is very important for us to understand our role very carefully as being part of whole biodiversity so that the delicate balance of our blue Planet is not disturbed.

The extent to which Earth's system is a part of our daily life and, in turn, to which our activities interfere with that delicately balanced system is now a matter of global concern. To focus on the positive aspects of this relationship and to create a sustainable future for humans and their planet, United Nations has proclaimed year 2008 as **International Year of Planet Earth**. (The activities will spread over three years beginning with the year 2007) International Union of Geosciences (IUGS) has also supported it; its purpose is to focus on the relationship between mankind and the planet Earth, and to demonstrate that how geoscientists can help in creating a balanced, sustainable future for both.

contd. on page 9...

हमारी पृथ्वी हमारी माता

हम धरती को माँ का दर्जा देते हैं, क्योंकि यही हमारी पालन-हार है। माँ के दूध की तरह हमारी आवश्यकताओं की सभी सामग्री इसी धरती की कोख से हमें प्राप्त होती है। हमारे पुराने धर्म-ग्रन्थ, ईषोपनिषद् भी हमें यही बताते हैं कि हमारे पूर्वजों के पूर्वजों ने भी इस धरती और अन्य प्राकृतिक संसाधनों जैसे, जल, वायु, जैव विविधता के महत्व को न केवल अनुभव किया बल्कि उसे सही ढंग से समझा। शायद तभी



इन्दौर-मुम्बई राजमार्ग पर, इन्दौर के निकट, भेड़ों के झुंड के साथ राजस्थानी घुमक्कड़ समूह का मुखिया

आम-आदमी को उनकी महत्ता समझाने के लिये विभिन्न संसाधनों को देवी-देवताओं का स्वरूप दे दिया गया। तभी प्राकृतिक आपदाओं को इन्हीं देवी देवताओं का प्रकोप माना जाता था। उन्होंने अपने स्वार्थ के लिये कभी भी इन संसाधनों का शोषण नहीं किया बल्कि उन्हें यथा सम्भव आदर व सम्मान दिया। उन्होंने प्रकृति के साथ रहना सीख लिया या उसने अपनी जरूरतों व पृथ्वी पर पर्यावरण को सन्तुलित रखने में सामंजस्य पैदा कर लिया था। उन्होंने खेती व अन्य जरूरतों के लिये प्राकृतिक संसाधनों के दोहन के ऐसे तरीके अपनाए जिससे पर्यावरण पर प्रतिकूल असर न पड़े। ऐसे तरीकों को पारिस्थितिकी अनुकूल कार्य (ईको फ्रेंडली प्रैक्टिस) कहा जाता है। औद्योगिक क्रांति व हरित क्रांति के साथ ही हम इन प्राकृतिक संसाधनों को संरक्षित रखने में अपना विश्वास भूलते जा रहे हैं।



खेतों में चरता भेड़ों का झुंड

दिनों दिन हर क्षेत्र में हमारी कार्य शैली बदल रही है। जिसका सीधा-सीधा प्रभाव हमारे प्राकृतिक संसाधनों पर पड़ता है। जिससे हमारे पर्यावरण का सन्तुलन बिगड़ता जा रहा है।

यह सब होने के बावजूद भी पर्यावरण-संतुलन का एक तरीका का हमें इन्दौर के आस पास के ग्रामीण इलाकों में देखने को मिला। यहाँ अधिकतर खेती वर्षा आधारित है तथा नवम्बर, दिसम्बर में अधिकतर खेत खाली ही पड़े दिखाई दिये। अभी पिछले दिनों इन्दौर के स्कूल में "आम जीवन में भौतिकी का उपयोग विषय" पर एक ज्ञान मेले का आयोजन किया गया था, जिसमें इन्दौर के

लगभग 30 स्कूलों ने भाग लिया। हम लोग शाम को वापस लौट रहे थे, तो हमें इन खाली पड़े खेतों में भेड़ों व बकरियों के बड़े-बड़े झुंड दिखाई दिये और साथ ही कुछ लोग जो खेत में अपना अस्थायी तम्बू गाड़ रहे थे। वेष-भूषा से, विशेष कर उनकी पगड़ी, देख कर उन्हें आसानी से पहचाना जा सकता था कि वे राजस्थान की किसी घुमक्कड़ प्रजाति के लोग हैं।

हमारी उत्सुकता हमें रोक नहीं पाई और हमने उनसे बातचीत की और जो बात सामने आई वह बहुत की रोचक थी। इन लोगों के मुखिया ने हमें बताया कि पहले से ही उनके पूर्वजों की भेड़-बकरियाँ राजस्थान से यहाँ ले आते थे और स्थानीय ज़मींदार उन्हें खेत में रहने व बकरियों को चराने की इजाज़त देते थे। इस परम्परा से भेड़-बकरियों का पेट भर जाता था और उनकी मँगनों (ड्रॉपिंग्स) के रूप में ज़मींदार के खेत को बहुत ही उम्दा खाद मिल जाती थी। झुंड के मुखिया के अनुसार "हमें अपने खेत में रहने के अलावा ज़मींदार लोग इनाम के रूप में हमें पैसा व अनाज भी दिया करते थे, परन्तु अब यह व्यवस्था समाप्त हो रही है। अब हमें ज़मींदारों के खेतों को उपजाऊ बनाने का कोई इनाम नहीं मिलता। खेती के तरीके जो बदल रहे हैं। परन्तु वर्षा के बाद जब यह मेगनों की खाद मिट्टी में मिलती थी तो लहराती फसल पैदा होती थी परन्तु आज किसान अधिक अन्न पैदा करने के चक्कर में 'कट्टों की खाद' (यानि रसायनिक खाद) डालते हैं, जो मिट्टी को खराब करती है और उसमें जो फसल पैदा होती है, उसमें वो स्वाद भी नहीं होता, जो पहले की फसलों में होता था।"

हमें लगा कि आज हम जिस टिकाऊ खेती व पोषणीय विकास (सस्टेनेबिल डेवलपमेंट) व कार्बनिक भोजन (आर्गेनिक फूड) की बात कर रहे हैं, क्या हम पहले जिस तरह से खेती करते थे वह क्या पोषणीय नहीं थी? और जो उसमें अन्न पैदा होता था, क्या वो कार्बनिक भोजन नहीं था? हमने अपने चलन को छोड़ कर नये तरीके से खेती करनी शुरू की तो उसके परिणाम शीघ्र ही सामने आने लगे। पंजाब के कई किसानों की यही शिकायत है कि अधिक रसायनिक खाद व कीटनाशकों के कारण उनके खेतों की उर्वरकता बहुत की कम हो गई है। तो क्या हमें फिर अपने उन्हीं परम्परागत तरीकों पर लौटना होगा जो न केवल



विज्ञान प्रसार की टीम भेड़ पालकों के साथ

प्रकृति से सामंजस्य स्थापित किये हुए थे वरन अधिक टिकाऊ व पर्यावरण संरक्षण के हिसाब से भी अनुकूल थे। तो क्यों न ऐसे तरीकों को लिपिबद्ध किया जाए और उन लोगों तक भी पहुँचाया जाए जो अब पुनः टिकाऊ खेती व पर्यावरण के संरक्षण को लेकर सजग हैं।

यदि आपके क्षेत्र में भी ऐसी कोई प्रणाली, विधि या तरीका है जो 'टिकाऊ' व ईको फ्रेंडली हो तो आप पूर्ण विवरण, चित्रों सहित हमें लिख भेजिये। आपके नाम के साथ हम उसे इस समाचार-पत्र में शामिल करेंगे। अच्छे लेखों को उचित प्राथमिकता भी दी जाएगी।

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LORDS OF EARTH: DINOSAURS

What are dinosaurs?

Ancient reptiles with strong leg muscles and heavy hips, hind legs and ankles to facilitate leg movement below the body permitted dinosaurs to bring their knees and ankles directly below their hips. Skeletons designed to support a large body in erect posture and for easy running. Front legs for grasping the prey and hind legs supported the weight at times up to 120 tonnes. Dinosaur skulls were designed for maximum strength and minimum weight. Perhaps a large body size kept most predators at bay and helped to regulate internal body temperature. No modern animals except whales are comparable in size to the giant dinosaurs. Dinosaurian world was different. The climate and food chain helped them attain mega sizes.

When and how was their time?

For 165 million years dinosaurs straddled the earth as its real lords. From 230 to 65 million years back Triassic, Jurassic, and Cretaceous Periods belonged to dinosaurs. Each period saw different dino species, come and go e.g. in the Jurassic, dinosaur *Stegosaurus* already had been extinct for approximately 80 million years before the Cretaceous dinosaur *Tyrannosaurus* appeared. The time separating *Stegosaurus* and *Tyrannosaurus* is more than the time separating *Tyrannosaurus* and man. In the Triassic Period, there was one super continent on Earth, Pangea. As Pangea broke



up, dinosaurs became scattered on separate continents and new types evolved separately in new palaeogeographic regime.

What was the biggest size?

Largest complete dinosaur known was *Brachiosaurus* i.e. 23 m in length and 12 m in height. Leg bones and vertebrae of larger dinosaur species are known, but being incomplete do not let you guess exact size. *Argentinasaurus* and *Amphicoelias* might have been one and a half to two times larger than *Brachiosaurus*. Smallest dinosaur was only slightly larger than a chicken. *Compsognathus* was 1 m long and probably weighed about 2.5 kg. All the three dinosaur types lived during Jurassic.

Where did they live?

Dinosaurs lived on all continents. But for Higher Himalayas, their fossils and eggs are well spread almost all over India. During the 165 million years of their existence, dinosaurs witnessed breaking

up and drift of super continent Pangea into a more or less present geographic arrangement by plate tectonics.



How are dinos named?

Normally after a body feature, place of discovery or after the discoverer. Name comprises two Greek or Latin words which are the genus (plural, genera) and the species name e.g. the Greek and Latin combination (binomen) *Tyrannosaurus rex* means "king of the tyrant lizards."

How did they communicate?

They displayed defensive postures, love and fights through vocal and visual signs. *Triceratops* bull when angry would shake his head and make him understood!

What followed dinos?

Dinosaurs became extinct nearly 65 million years ago. Only small mammals, shrew-sized primates, coexisted with dinosaurs. In China there was a real match to dinosaurs in some mammals who tore chunks of small dinos and swallowed them without even chewing. It was a rare case of mammals administering their own medicine to dinosaurs. Mammals developed once dinos faded away.

How fast did dinos run?

Several methods have been used to calculate their speed. Two basic methods involve comparing with recorded speeds of modern animals with similar size and build up. Distances between fossil footprints in a fossil dino track way are measured and speed calculated. Estimates for medium-sized two-legged dinosaurs vary from 4 to 6 km/hour. Maximum speed estimated from 37 km/h to 88 km/h.

How long did individuals live?

Life spans may be linked to their body size and metabolism and might have been from a few decades to a few centuries.

How many species of dinosaurs are known?

Roughly 700 species are recorded. Many more may be yet to be described.

Were they social?

They traveled and migrated together e.g. dinosaur fossils have been found above the Arctic Circle! Nesting sites with badly crushed

Do-it-Yourself

Hi..! schoolkids and teachers! Surely these Dinosaur points excite your imagination; come try doing some of these exercises yourself and reach into the dinosaur world:

- a) work out how continents were positioned from appearance of dinosaurs on to their disappearance; draw the palaeogeographic maps from time to time; make card board models of such palaeogeographic maps in suitable size for display in your school;
- b) Look up internet and register yourself on about.com to receive regularly the newsletter of aboutgeology.com and look up archives of the newslteter; it will give you easy access to simple but scholarly and exciting information about earth science systems present and past;
- c) cut out card borads or ivory sheets in the shape of any ten dinosaurs which excite you most and clourfully draw their sketches pasting ivory sheets over the card boards for display in your schools;
- d) look up some science encyclopaedia and draw posters putting dinosaurs in their palaeobiogeographic scenarios as you can visualise;
- e) if you are living in or near Indian dinosaur fossil localities, have an outing to the locality and teach the villagers about dinosaurs and their fossil eggs and need to conserve this rare heritage of the country on site;
- f) Visit some famous Dinosaur museums (e.g. Chandigarh, Calcutta, Hyderabad etc), in the meanwhile create wall magazines on dinosaurs in your localities. If you need CD of Chandigarg Dinosaur Museum you can write to me through your School Principal, I promise a free gift of a CD to the school on behalf of Geological Society of India, Bangalore which has initiated Popular Geology Programmea in major cities. You can contact Dr. B.P. Radhakrishna, President of the Society, "Geological Society of India" gsocind@gmail.com for help or a Geologist close to your locality;
- g) If you are excited about Geology, after your plus 2, join a B Sc Geology Course in a College or a University and become a Dinosaur researcher;

When you have done all I suggested above, you form regional groups of dinosaur lovers and get in touch with dinosaur experts in our country in universities, research institutes and Geological Survey of India to travel across the country as a homage to the dinosaurs who are no more. You know why? Perhaps due to the massive volcanic flows in western, central and souhthern parts of India about 65 million years ago. To see this you need to visit these flat topped hills or even watch some Bollywood films often picturised in Bombay and around over these rocks. The famous cotton growing black soil comes out of weathering of these rocks. You can go gem hunting in the cavities in these black basaltic rocks. Buy a Geological Map of India costing Rs 100 from any Geological Survey of India sale outlet to see this green patch of basalt which was one of the biggest basaltic eruptions in earth's history which changed the skies and vegetation for a very long span in Earth's history, disrupting food chain, causing acid rains and suffocating dinosaurs out of earth's history.

eggshells and skeletons of baby dinosaurs still in the nests suggest that some babies stayed on in the nests even after hatching and may have been fed by parents.

What color were dinos?

Direct evidence of dinosaur skin colour not known. Most dinosaurs possibly were brightly coloured like lizards, snakes, or birds.

What did they eat?

Some ate lizards, turtles, eggs, or mammals, others ate dead animals. Most ate plants. Dinosaur bones are found together with fossil pollen and spores indicating plant diversity in Mesozoic Era. The last of the dinosaurs certainly ate fruit.

What made them extinct?

Individual dinosaur species were evolving and becoming extinct for various reasons. Massive extinction at the end of the Cretaceous wiped out the last of the dinosaurs, the flying reptiles, and the large swimming reptiles, as well as many other marine animals. Meteorites impact partially was the cause. Extensive release of volcanic gases, climatic cooling, sea-level change, lowered reproduction rates, variations in the Earth's orbit or magnetic field may have also contributed to extinction of dinosaurs. India's Deccan volcanics exposed in vast areas of western, central and southern India as flat topped hills with black cotton soil capping, are thought to be a major enemy of dinosaurs

in multiple ways. Little do we realize while traveling through Rajasthan, Gujarat, M.P., Maharashtra, A.P. or Karnataka etc that these layered rocks are actually a result of one of the most deadly



and extensive basaltic flows in the earth's history which darkened skies, showered acid rains, destroyed vegetation and finally wiped out the lords of the earth forever.

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Photo Courtesy: Govt. Museum, Chandigarh

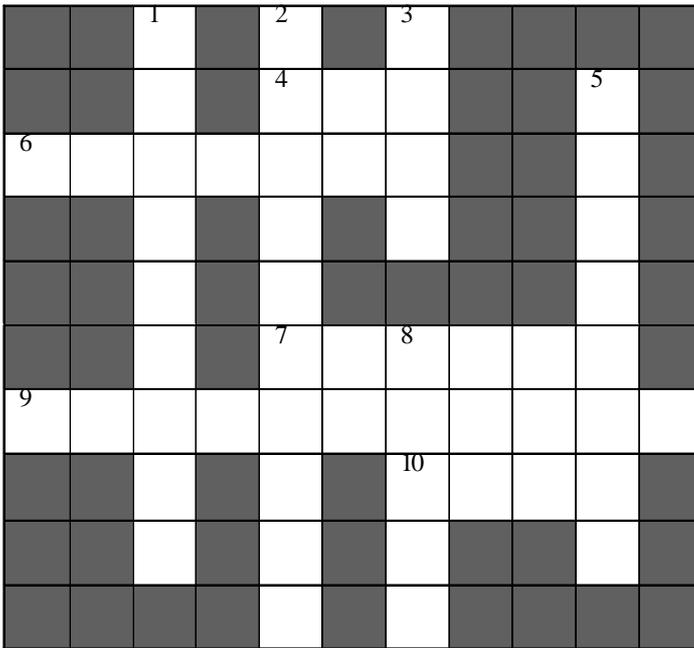
Astronomy Crossword-10

Dear Friends,

Welcome to Astronomy Crossword. Solve the Crossword and send it to VIPNET News till March 15, 2006. The three winners will be selected by draw of lots from received correct entries. The names of winners will be announced in March 2006 issue. Winners will get an Astronomy activity kit as a prize by post. Please send your entries to: -

Astronomy Crossword-10
VIPNET News, Vigyan Prasara,
A-50, Institutional Area, Sector 62,
Noida-201 307 U.P.

Astronomy Crossword-10



Horizontal Clues:

4. One of the zodiacal sign
6. The largest planet in the solar system
7. Rakesh is the first Indian who did space journey
9. Important layer of Earth's atmosphere which start from ground to about 10 to 15 km
10. City, where India's well known institute 'Inter-University Center for Astronomy and Astrophysics' is placed

Vertical Clues:

1. A rare celestial phenomenon occurs when high mass star ends in an explosion resulting an extremely bright, short lived object that emits vast amount of energy
2. The type of sound wave whose frequency is above the sonic waves and such sound waves are used in medication
3. Long period comets originate from these clouds which start after the kuiper belt
5. This is a part of Electromagnetic Radiation and such goggles are used in military navigation
8. In the history of science, it is mentioned that fall of this fruit gives an idea of gravitation to Newton

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स्टार्च किन खाद्य पदार्थों में है?

क्या लेना है?

- कांच का गिलास, टिंचर आयोडीन, गेहूं व चावल का आटा, आलू, फल एवं तरकारियां, ड्रॉपर।

क्या करना है?

- आयोडीन विलयन तैयार करना है। (दो बूंद टिंचर आयोडीन + पानी की 10 बूंदें।)
- एक कांच के गिलास को पानी से आधा भरना है।
- पानी में आधा चम्मच आटा मिलाकर हिलाना है।
- अब टिंचर आयोडीन विलयन की दो-चार बूंद गिलास में डालनी है।
- घोल के रंग को देखना है।
- अलग-अलग प्रकार के पदार्थ लेकर प्रयोग को पुनः करना है।



क्या बताना है?

- प्रत्येक पदार्थ में आयोडीन से किस प्रकार का रंग आता है।

क्या कारण है?



आयोडीन विलयन से जिन खाद्य पदार्थों में बैंगनी रंग बनता है उनमें स्टार्च की उपस्थिति है।

क्या याद रखना है?

- स्टार्च युक्त पदार्थ आयोडीन के मिलने से बैंगनी रंग के हो जाते हैं।

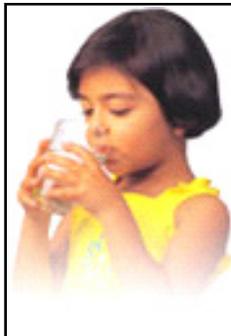
□ स्रोत: गिलास से कुछ और खेल, प्रकाशक: विज्ञान प्रसार

BIOLOGICAL IMPORTANCE OF WATER

Our human body is consist of about 75%-78% of water at the time of birth which declines up to 50% by the age of 60 years. On an average normal human being contain 60-70% of water by weight. The fluid requirement of body is about 22 ml/kg at 22.2°C which increases up to 38 ml/kg at 37.8°C in adults. On an average an adult human being requires about 2700 ml-3000ml water per day for normal functioning of body. Water is an essential part of cell cytoplasm and any loss or accumulation of fluid in cell may lead to acute metabolic disorders, which finally results in dehydration, diarrhea, nausea fever, abnormal intestinal absorption and much more. When Body fluids are reduced by 1%, symptoms of severe dehydration appears, a 20% reduction is fatal, whereas an increase to a level of 10% above normal also results in disorders like edema. Today about 75% of Americans are chronically dehydrated and in about 37% of Americans, thirst mechanism is so weak that is often mistaken for hunger. Generally 2% drop in body water can trigger fuzzy short term memory, trouble with basic math's and difficult focusing on computer screen or printed page.

However chemically water do not contains any vital nutrient, enzymes, vitamins, hormones or any calories but still it has ethereal power and metaphysical energy to support life. During 1970 Stephan Taylor of New Zealand survived for 40 days only on a glass of water per day and the longest time period for which human being had survived without water is 17 days. One glass of water shut down midnight hunger pangs for almost 100% of dieters studied in university of Washington. Preliminary research also indicates that 8-10 glass of water a day could significantly ease back's joint pain for about 80% of sufferers. Drinking 5 glasses of water daily decreases the risk of colon cancer by 45%, breast cancer by 79% and

bladder cancer by 50%. Advanced modern technologies also reveals the fact that by increasing the magnetic vibrational energy (Total energy) of



water molecules, its vitalizing power can be enhanced for longevity.

ROLE OF WATER IN OUR BODY

The major role of water is to maintain the fluid balance in our body and one way to do this is to quench the sensation of thirst. Lack of water in a body may result in Mental Fatigue or Muscle Weakness, Thirst, Headache, Nausea,

Kidney	83%
Brain	75%
Lungs	86%
Bones	40%
Muscles	75%
Blood	92%
Heart	75%
Liver	86%

Dry Skin/Hair, and Weakness. Excess or lack of respiration is the indication of needing more water and water also regulates Ph (Acid-Alkaline) balance of body and maintains it at about 7.4 with the assistance of kidney. Water helps to maintain normal body temperature at 98.6° F. Water also regulates Haemostatis i.e. maintaining extra-cellular fluid (ECF) and intracellular fluid (ICF) balance. Water with some solutes in it works as an effective lubricant in Synovial fluids of joints lacking of which causes arthritis. Glycogen the form in which carbohydrate is stored is about two thirds water. The deposition of fat involves the accumulation of additional

20% water and muscle involves 75%. Research studies showsthat reduction of 4% to 5% in body water results in a decline of 20% to 30% in work performance.

WATER INTOXICATION - In warm weather during excessive perspiration (Sweating) with the loss of water, sodium loss also occurs and when in such scarcity of sodium water is taken inside the body then due to decreased sodium concentration in extra-cellular fluid water enters the cells rapidly or potassium leaves the cell to balance the electrolyte concentration inside and outside the cell. In this condition over hydration of cells causes cramps causing drop in blood pressure and weakness. This condition is termed as Water Intoxication and it can be avoided by taking common salt tablet (NaCl) along with water at regular interval to compensate the loss of sodium. Water intoxication can be identified by increased urinary volume of low specific gravity.

In India Rajeev Gandhi National Drinking Water Mission (RNGDWM) is the most efficient & effective mission to promote availability of safe drinking water since 1991 onwards specially in rural areas. Swajaldhara is another very important fruitful programme in this race lounched in 2002 by Dept. of drinking water supply (DDWS)

United Nation says by the year 2025 two third of humanity will face shortage of safe drinking water and on an average water supply per person will be reduced by 33% then that of presnt water supply. The World Health Organization estimates show that about 80% of all diseases and sickness are due to lack of safe drinking water. More then 5 million people die around the globe due to water born diseases. Most philosophers' and scholars' estimations say that water crises may be the root cause for third world war in future.

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TREATMENT OF CANCER

In the previous issues we discussed the three major modalities of treatment of cancer, Surgery, Chemotherapy and Radiotherapy. There are other modalities and newer therapies being used today for cancer care:-

Hormonal therapy

Some cancers like Breast, prostate and of uterus are hormone dependant. Hormonal therapy is used here for treatment, in prevention of recurrence and second cancers and also to prevent cancers. Tamoxifen is the most common of these, which is an anti estrogen and used for five years in cases of breast cancer.

Laser Therapy

Lasers are being extensively used these days to excise skin tumors and small cancers of head and neck, They are also used to control bleeding for inoperable cancers.

Thalidomide

Thalidomide is a drug that is used in slow growing recurrent, advanced or residual cancers, it is an antiangiogenesis agent, which stops the blood flow to the cancer cells causing their death and preventing growth.

Radioactive Frequency ablation

Radioactive frequency ablation is a technique where cancer cells, specially in the liver are killed by exposing them to radio frequency waves. This can be done by directing the waves through a needle under ultrasound guidance or during open surgery.

Photodynamic Therapy

This is a technique by which special light waves are used to kill cancer cells. Special photosensitive agents are injected in the tumor. when this is exposed to special light waves, the reagent gets activated and releases energy to kill the cancer cells. This is very helpful in lesions of the skin.

Radioactive ablation

Radioactive ablation is a method where radioactive reagents specially targeted to specific organs are used to kill cancer cells. Most commonly used here is radioactive Iodine ablation for cancer of Thyroid Cancers.

Intra-arterial chemotherapy

For better results chemotherapy can be delivered directly to the cancer cells, especially in the liver by placing a delivery port in the artery supplying blood to the involved organ.

TACE (Trance arterial chemo embolization)

The artery supplying the involved organ can be blocked by interventional radiology techniques and chemotherapy injected

to ensure direct and permanent action of the chemotherapeutic agent on localized cancer areas.

Embolisation

The blood supply to the involved organ can be stopped by embolising (blocking) the blood vessels supplying the involved organ. This can be done under interventional radiology and various materials like gel foam and lipiodol are used to block the blood vessels.

Intracavitary chemotherapy

Chemotherapy can be instilled inside the body cavities, especially that of the abdomen, lungs and brain to treat disseminated (widespread) cancers.

Intra Operative Radiotherapy

Radiotherapy is often given directly to the involved organ directly while surgery, specially if a part or total of it cannot be removed.

IMRT (Intensity Modulated Radio therapy)

This is a technique where radiotherapy is directly precisely to a localized area under computerized control and image monitoring. This is very helpful for cancers of prostate, brain and head and neck region.

Argon Beam

A special cautery machine delivers argon beam. The argon beam is helpful in destroying superficial cancer cells on surface of body or organs and more useful in controlling bleeding from the cancerous region.

Stem cell and Bone marrow transplant

This technique is used in patients of blood cancers or in metastasis cases of cancers of solid tumors.

Here the Stem cells and bone marrow (which produce blood cells)are removed. Patient is then given high dose chemotherapy to kill all cancer cells and then the removed stem cells or bone marrow cells are reinfused.

Gene therapy

Research in gene therapy has come a long way and will soon be used in treatment and prevention of cancer. Gene Therapy changes the altered genes that cause cancer. It will be used to remove, repair and replace defected genes in patients at high risk of cancer or whose with familial history of cancer.

□ Lt Col S Kapoor VSM

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विपनेट प्रश्नावली 116 के उत्तर

वि पनेट न्यूज़ के अक्टूबर 2005 अंक में प्रकाशित विपनेट प्रश्नावली के विजेताओं के नाम एवं प्रश्नों के उत्तर यहाँ प्रस्तुत हैं। विजेताओं को विज्ञान प्रसार की पुस्तकें पुरस्कार स्वरूप भेजी जा रही हैं। बधाइयाँ...!

प्रश्नावली 116 के विजेता :-

1. वरुण कुमार दुआ, बहादुरगढ़
2. देवेन्द्र कुमार पाण्डे, पूर्वी चम्पारण, बिहार
3. राकेश लौवंशी, होशंगाबाद, म.प्र.

क्या गर्म कपड़ों से शरीर का तापमान बढ़ता है?

आपको यह जानकर आश्चर्य होगा कि गर्म कपड़ों से हमारे शरीर का तापमान नहीं बढ़ता है। ये कपड़े तापरोधक का काम करते हैं और शरीर की गरमी को बाहर जाने से रोकते हैं।

इसे आसानी से समझा जा सकता है। बर्फ के टुकड़ों की दो थैली लें। एक थैली को खुले में रखें और दूसरे पर गर्म कपड़ा लपेट दें। थोड़ी देर बाद देखेंगे तो पता चलेगा कि खुले में रखे बर्फ के टुकड़े पिघल गए हैं। लेकिन गर्म कपड़े में लिपटे बर्फ के टुकड़े बहुत कम पिघले हैं। हालांकि गर्म कपड़े से बर्फ का तापमान नहीं बदलता है। दूसरे शब्दों में कहें तो गर्म कपड़े ने बर्फ को ठंडा रखा है अर्थात् गर्म कपड़े ऊष्मा को अंदर से बाहर जाने तथा बाहर से अंदर आने से रोकते हैं।

गैस की लौ की तुलना में मोमबत्ती की लौ से रोशनी अधिक क्यों होती है?

आपने देखा होगा कि मोमबत्ती की लौ पीली और गैस की लौ नीली होती है। देखने में नीली लौ अपेक्षाकृत ठंडी लगती है लेकिन वास्तव में यह पीली लौ की तुलना में काफी गर्म होती है। एक प्रयोग से इसे आसानी से समझा जा सकता है। परीक्षण नली में ऐसा रसायन लें जो नीली लौ में ही पिघलता हो। अब बुन्सेन बर्नर की लौ को पहले पीला करें और फिर नीला करें तो आप देखेंगे कि वह रसायन पीली लौ में तो नहीं पिघला, लेकिन नीली लौ में पिघल गया। इससे साबित होता है कि नीली लौ ज्यादा गर्म है।

अब दोनों लौ से निकलने वाली रोशनी को देखते हैं। पीली लौ अधिक प्रकाशमान होती है, क्योंकि इसमें दहन की प्रक्रिया अधूरी होती है। इस लौ में कार्बन के अनेक कण जल नहीं पाते। उनकी चमक से ही पीली लौ अधिक प्रकाशमान लगती है। अधजले कार्बन के कारण ही पीली लौ से काजल बनता है।

अतः खाना बनाने के लिए हमें नीली लौ कि जरूरत होती है और प्रकाश के लिए पीली लौ की।

□ विपनेट डेस्क

VIPNET Questionnaire 119 विपनेट प्रश्नावली 119

प्रिय साथियों,

यहाँ हम दो प्रश्न दे रहे हैं, जिनके उत्तर आप 15 मार्च, 2006 तक भेज सकते हैं। डॉ. के द्वारा तीन सही प्रविष्टियों के विजेताओं का चयन होगा, जिनके नाम के साथ सही जवाब प्रकाशित किये जाएँगे और पुरस्कार स्वरूप विज्ञान प्रसार की पुस्तकें भेजी जाएँगी। आप अपने उत्तर हिन्दी या अंग्रेजी में भेज सकते हैं।

प्रश्न 1 : एक आँख से निशाना साधने में आसानी क्यों होती है?

Question 1: Why do we find it easier to aim with one eye?

प्रश्न 2 : दरवाजे की घंटी बजने से रेडियो की आवाज क्यों घरघराने लगती है?

Question 2 : Why is radio reception disturbed by the ringing of a door-bell?

अपने जवाब इस पते पर भेजें:-

विपनेट प्रश्नावली -119

विज्ञान प्रसार

ए-50, इंस्टीट्यूशनल एरिया,

सेक्टर 62, नोएडा - 201 307

(उ.प्र.)

VIPNET Questionnaire -119

VIGYAN PRASAR

A-50, Institutional Area,

Sector 62, Noida - 201 307

(U.P.)

Correct Answer of Astronomy Crossword-8

1	M	A	N	T	L	E			
2	A	R	I	E	S				
6	K	I	R	C	H	H	O	F	F
	A	G		L	O				I
	R	E		I	C	E			S
		L		P	K				S
				T					I
			9	T	I	D	A	L	O
					C				N

Name of the Winners:-

1. Vikas Kumar, Dumra, Sitamarhi, Bihar

2. Biren Mallik, Salt Lake, Kolkata

3. Tapas Pradhan, Puri, Orissa

Congratulations..! An Astronomy kit will be sent to all winners.

Editor

एक अंगूठा एक औजार

आ

पने एकलव्य की कहानी तो जरूर सुनी होगी। वो एक बहुत ही अच्छा तीरन्दाज था। वह द्रोणाचार्य के पास विद्या सीखने गया परन्तु उसे निराश लौटना पड़ा। क्योंकि द्रोणाचार्य तो केवल राजकुमारों को ही विद्या देते थे और उनमें भी वे अर्जुन को सर्वश्रेष्ठ तीरन्दाज बनाना चाहते थे। एकलव्य निराश नहीं हुआ। उसने वापस जंगल में आकर घास-पूस से द्रोणाचार्य की एक प्रतिमा बना ली और लगा अभ्यास करने। एक दिन अभ्यास के दौरान एक कुत्ता भौंक रहा था जो उसका ध्यान भंग कर रहा था। उसने इस प्रकार तीर चलाए की कुत्ते को बिना घायल किये उसका मुँह तीरों से भर दिया। उसी समय गुरु द्रोणाचार्य भी जंगल भ्रमण पर थे। उन्होंने कुत्ते के मुँह को वाणों से भरा देखा तो वे तीरन्दाज के हुनर पर हैरान रह गये। उन्हें लगा कि अर्जुन से बेहतर कोई और तीरन्दाज कैसे हो सकता है और जिसने ये तीर चलाया है उसका गुरु कौन है? वे उसी दिशा में एकलव्य को खोजने चल पड़े जिस दिशा से कुत्ता आया था। उन्होंने देखा की एक वनवासी बालक एक घास-पूस की मूर्ति के सामने तीर चलाने का अभ्यास कर रहा है। एकलव्य ने अपने गुरु को देख तुरन्त उन्हें प्रमाण कर उनके चरण स्पर्श किये। द्रोणाचार्य ने वनवासी एकलव्य के कौशल की प्रशंसा करते हुए उसके गुरु का नाम पूछा। एकलव्य से स्वयं अपना नाम गुरु के रूप में सुन कर द्रोणाचार्य स्तब्ध रह गये। उन्हें तुरन्त विचार आया कि वे तो अर्जुन को सर्वश्रेष्ठ तीरन्दाज बनाना चाहते हैं, परन्तु एकलव्य तो अर्जुन से श्रेष्ठ है। तभी उन्होंने एकलव्य से गुरु-दक्षिणा की माँग की। एकलव्य ने कहा गुरु आज्ञा करें। द्रोणाचार्य ने एकलव्य से दाहिने हाथ का अंगूठा माँग लिया। एकलव्य ने बिना क्षण गंवाये अपना अंगूठा काट गुरु के चरणों में रख दिया।

यहाँ प्रश्न यह पैदा होता है कि गुरु द्रोणाचार्य ने एकलव्य का अंगूठा ही क्यों माँगा? अगर हमारा अंगूठा न हो तो क्या होगा..! आओ एक प्रयोग करते हैं। एक सुई को जमीन पर गिरा दो। अब बिना अंगूठे के उपयोग करे सुई को उठाओ..! देखा कितना आसान काम मुश्किल हो गया..! मनुष्य का पहला औजार अंगूठा ही है और केवल मनुष्य ही ऐसा प्राणी है जो अंगूठे का पूर्ण प्रयोग कर सकता है। मस्तिष्क तो थोड़ा या ज्यादा सभी जीवों में होता है, परन्तु मनुष्य अगर श्रेष्ठ है तो अंगूठे के कारण, न कि मस्तिष्क के कारण। मस्तिष्क में उठे विचार व कल्पनाओं को साकार करने की क्षमता मनुष्य में है तो यह केवल अंगूठे के कारण है, न कि मस्तिष्क के कारण। अगर अंगूठा न होता तो क्या होता? विचार करो।

अंगूठे के अलावा हम अपने घर पर भी अलग-अलग काम करने के लिये कई तरह के औजारों का उपयोग करते हैं। कई औजार तो बहुत की सरल किस्म के होते हैं, जैसे लिखने के लिये कलम या पैन, फटे कपड़े सिलने के लिये सुई, ठोकने-पीटने के लिये हथौड़ा या पत्थर, काटने के लिये चाकू या दरारी और चटनी बनाने के लिये सिल-बट्टा। हम इन सब औजारों से अपना काम आसानी से कर लेते हैं, परन्तु क्या इन औजारों का उपयोग हम बिना अंगूठे के सरलता पूर्वक कर पाएंगे..? तो आइये एक सूची बनाते हैं कि एक दिन में यानि सुबह से लेकर शाम तक हम अपना काम आसानी व सरलतापूर्वक करने के लिये किन-किन औजारों का उपयोग करते हैं। ये औजार बाजार के बने-बनाए भी हो सकते हैं, और ऐसे भी जिन्हें हम स्वयं बनाते हैं। तो आइये निम्न तालिका के अनुसार औजारों की सूची तैयार करते हैं:-

क्रम सं.	औजार का नाम	औजार किस काम के लिये उपयोग होता है	कैसे उपयोग करते हैं	औजार आपने स्वयं बनाया या बाजार से खरीदा है	क्या इस औजार का उपयोग बिना अंगूठे के हो सकता है	बिना अंगूठे के उपयोग करने से क्या कठिनाई आती है

- उपरोक्त सारणी के आधार पर अंगूठे की उपयोगिता पर एक रिपोर्ट तैयार करें तथा अपने दोस्तों के साथ उस पर विचार विमर्श करें।
- ऐसे अन्य प्राणियों की सूची तैयार करें जो औजारों का उपयोग करते हैं।
- ऐसे प्राणियों की सूची तैयार करें जो अपने अंगूठे का उपयोग, औजार के रूप में कर सकते हैं।

□ बी.के. त्यागी

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The International Year of Planet Earth will cover issues related to following eight broad themes:

- Groundwater – towards sustainable use
- Hazards – minimizing risk, maximizing awareness
- Earth & Health – building a safer environment
- Climate – the 'stone tape'
- Resources – sustainable power for sustainable development
- Mega cities – going deeper, building safer
- Deep Earth – from crust to core
- Ocean – abyss of time
- Soil – Earth's living skin
- Outreach – bringing earth sciences to everyone

The current year 2006 has also been declared by the United Nations General Assembly as the **International Year of Deserts and Desertification**. The year will focus on the issues like process of Desertification, Combating Desertification etc. The IYDD therefore presents a golden opportunity to get the message across strongly and effectively that Desertification is a global problem. We can help stimulate efforts to fight it and make the International Year count

Vignyan Prasar is developing a host of activities/activity packages for awareness on various aspects of the planet Earth. The basic objective of this programme is to generate awareness and to understand our role, which we can play in maintaining and sustaining the critical balance between various species and resources on the Planet Earth. Your views and suggestions about the activities and programmes, which could be taken up by VIPNET science clubs during this period are welcome.

□ Editor

Some Polar Facts

What is a Polar Night?

The duration of a night at Polar regions may be as long as 179 days!

Polar night in the polar regions is the portion of the year when the Sun does not rise above the horizon. Its length may vary from twenty hours to 179 days at the Arctic (North Pole) or Antarctic Circle (South Pole). The Polar circles are the areas beyond the latitude 66°33' North or South. There is no sun during this period of the year, but with snow covered all around, a magical atmosphere of light and colour is experienced.



The present expedition team members of the Antarctic Expedition have experienced Polar night from May 20, 2005 to July 23, 2005 spanning a period of two months.

What is the location of 'Maitri'?

'Maitri' (Indian Antarctic Expedition Base station) is located at 70°45'58" South latitude and 011°43'56" East longitude.

What is Aurora polaris?

The aurora is a glow observed in the night sky usually in the polar zones. It is also known as "northern lights" or "aurora borealis," Latin for "northern dawn" as if the sun was rising from an unusual direction. Aurora borealis most often occurs from September to October and March to April. Its southern counterpart is called "aurora australis". So scientists prefer to call them "polar aurora" or "aurora polaris".



Aurora is now known to be caused by electrons of typical energy of 1-15 keV, i.e. the energy obtained by the electrons passing through a voltage difference of 1000-15,000 volts. The light is produced when



they collide with atoms of the upper atmosphere, typically at altitudes of 80-150 km. The ultimate energy source of the aurora is the solar wind flowing past the Earth.

What are the different modes of communication from Antarctica?

Antarctic expedition team members have access to satellite telephone, e-mail, Internet and Ham Radio. But there are also some problems of communication from Antarctica. One biggest problem is the cost of communication. INMARSAT Mobile Phone Satellite Network provides the different communication services to the expedition team members, the cost of which is very high. The phone and FAX service costs \$ 4.5 per minute while the data/e-mail service costs \$ 2.7 per minute! The expedition team

members have a mobile satellite terminal which is used for communication through INMARSAT satellite. It can also store & forward data/e-mail.

The INMARSAT satellites are geostationary satellite located at a height of about 36,000 km at the equator. So the satellite signals have to travel more distance up and down to Antarctica as compared to other places. This results in a high degree of "latency" or delay, which may be annoying when the team members talk to their family back home. During one way data transmission this may not be a problem. If ham radio is used, there is no cost of communication, but success of communication depends on good radio wave propagation conditions. The solar influence on the ionosphere above Antarctica sometime causes major propagation disturbances, including total blackouts due to polar cap absorption. Hams can hope to communicate with Shri B.P. Semwal, VU3BPZ (Communications Officer, Maitri) when he is active on the radio. His schedule time of operation in the ham band is 18:15 to 19:00 UTC on 14.150 MHz USB. He may also be found on 21.280 MHz for sometime at around 12:00 UTC.



Does 'Maitri' has a Post Office also?

Yes. The only Post Office outside the Indian territory, which is located at Maitri is a branch of North Goa Post Office.

Can Antarctic Expedition Team members access Internet?

Antarctic Expedition team members can access Internet but at an extremely sluggish speed. It is only 9 kbps (kilo bytes per second).

Why Antarctica has a sluggish Internet speed?

Every satellite has a limited bandwidth shared by a number of users. INMARSAT is not different.

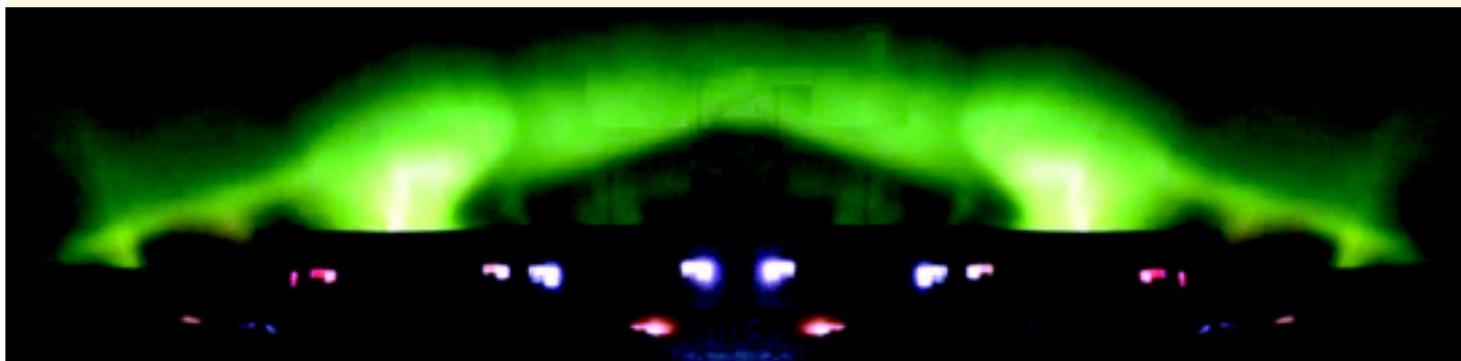
INMARSAT radio signals have a coverage of upto the 80 degrees South Latitude. The area where Maitri is located is just near to the edge of the 'Satellite Footprint' (the area covered by a satellite for receiving and sending of radio signals) of the geo-stationary satellite. So it suffers a weak signal condition. The access speed is very very slow; in few bits per second.

How big an e-mail to 'Maitri' (Antarctica) can be?

Because of the slow connectivity, expedition team members advise their friends and family members to keep e-mail size as small as possible. **The recommended size of an e-mail to Antarctica is just 50 kb** (Kilobytes). It is not at all advisable to send picture attachments to the Antarctica unless the picture size is optimized below the size of 50 kb.

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(Photo Courtesy: Shri B.P. Semwal)

Indian Antarctic Research Base- Maitri



A spectacular image of Aurora Polaris (on 22nd May, 2005) at the backdrop of Maitri

India launched its first expedition to Antarctica in the year 1981 which was led by Dr. S. Zahur Qasin. Secretary, Department of Environment, Government of India. Ever since, Indian expedition teams have been visiting the icy continent. The first expedition code named "Operation Gangotri" was undertaken in an icebreaker MV *Polar Circle* chartered from A/S G.C. Reiber Bergen, Norway. The first permanent station known as

Oasis. Dakshin Gangotri was abandoned in 1990. The second station was commissioned in 1989 and christened as "MAITRI" (70° 45' 58" South Latitude 11° 43'56" East Longitude) which means friendship in Hindi language. Schirmacher Oasis, a rochemoutainee having an area of about 35 sq.km. and is dotted with innumerable lakes, the largest being the Priyadarshani Lake (Zub Lake). The Priyadarshini Lake provides vital water supply to the



The first ever visit of the ministerial delegation of the Antarctica was led by the Union Minister of State for Science and Technology and Ocean Development Shri Kapil Sibal, in February, 2005



Shri B.P. Semwal, Communications Officer (extreme left) along with expedition team members.

"Dakshin Gangotri" was constructed during the third expedition (1983-84). Since then, year round presence of Indian scientist have been maintained. The Dakshin Gangotri Station got buried



Indian Antarctic Expedition Base Maitri

due to heavy snow accumulation in the shelf region and hence a new construction was taken-up in 1987 on terra-firm a rocky exposure about 60 nautical miles from DG known as Schirmacher

station throughout the year. Maitri station is a general purpose, double storied building with 25 single occupancy rooms as well as research and recreation facility. It is an air-conditioned building and maintains a temperature of +20 degree Celsius. The level-1 of Maitri houses the living, research and all life support systems whereas, the second floor hosts the storage area. It also houses a post office, a branch of North Goa Post Office. It is the only post office outside the Indian Territory and offers cancellation on 26 January, Republic Day. At Maitri, our closest neighbors are the Russians. The Russian Station Novolazarevskaya is about 5 km east of Maitri on Schirmacher Oasis itself. Worldwide Antarctic Programme reference WAP-IND 03 for the period Dec 2004 to March 2006.

□ Bhagwati Prasad Semwal (VU3BPZ)
XX (2000-02) & XXIV (2004-06)
Indian Antarctic Station – Maitri
Email: maitri@ncaor.amosconnect.com
(Photo Courtesy: B.P. Semwal)



Angel Matric. Hr. Sec. School, Thiruninravur, Tamilnadu organised an Astronomy Exhibition in celebration of Silver Jubilee year of the school



Seuj Prakriti, Lakhimpur, Assam conducted Science activities on Hiroshima Day, August 6, 2005 and demonstrated an Astronomy activity kit, developed by Vigyan Prasasr



Jagran Kalyan Bharti, Forbisganj, Bihar organised awareness programmes and various competitions for school students on World Year of Physics 2005



Kanpur unit of Science Research Club, Banda U.P. organised Science activities on Water Conservation, Club members demonstrated their models in district level National Children Science Congress



Raichur Vigyan Kendra, Raichur, Karnataka organised an exhibition on Portraits of Physicists on the occasion of World Year of Physics 2005



Raichur Vigyan Kendra, Madam Curie Vigyan Sangha, District Administration and Panchayat Samiti, Raichur, Karnataka jointly organised Rajiv Gandhi Akshay Urja Divas on January 19, 2006

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