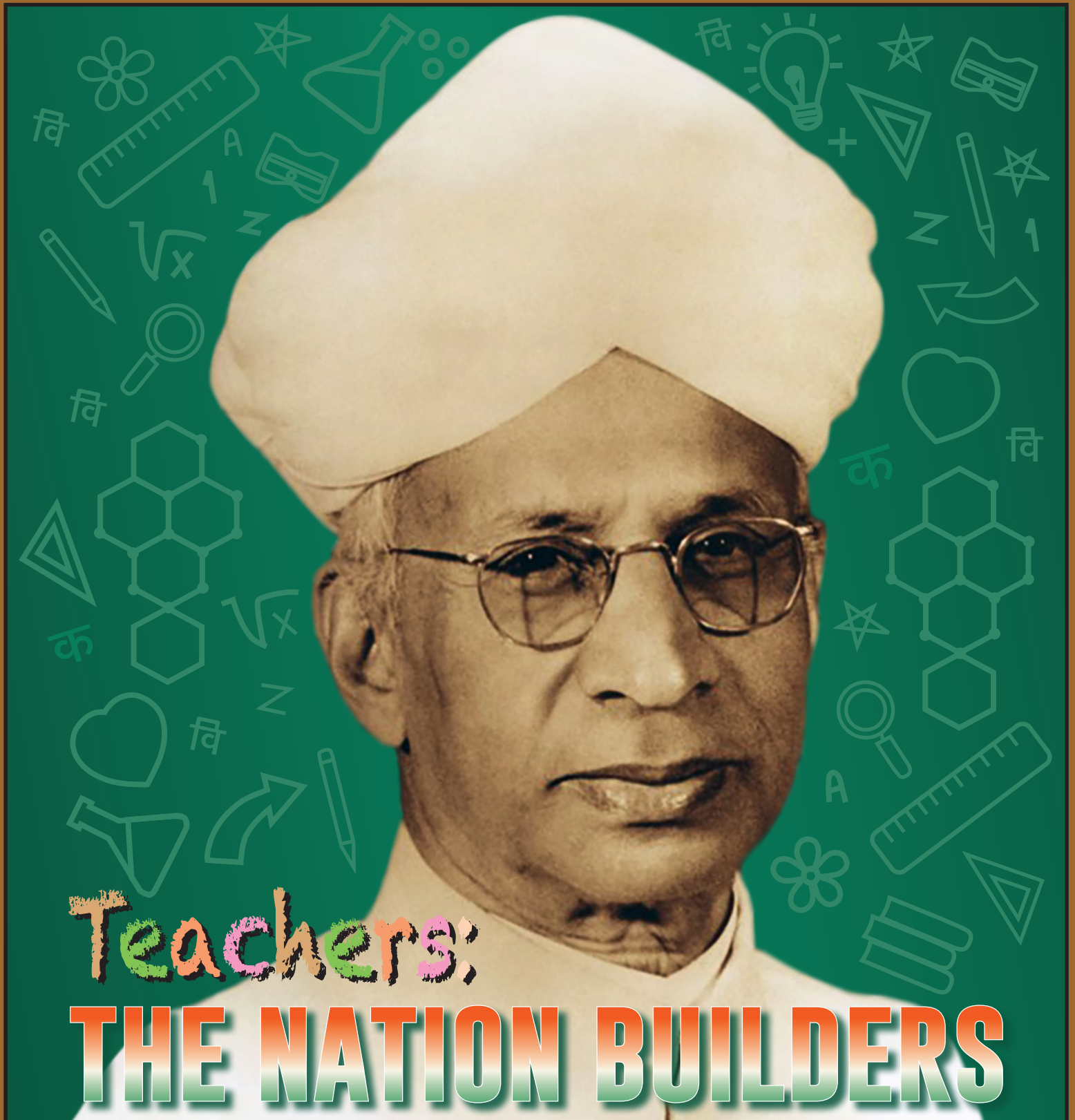




CURIOSITY

VIPNET NEWS—VIGYAN PRASAR NETWORK OF SCIENCE CLUBS

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Teachers:

THE NATION BUILDERS

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EDITORIAL

Arvind C. Ranade

National Teacher's Day:

The month of September is exciting in many ways. We celebrate 5th September as National Teachers' Day since 1962 as a tribute to Bharat Ratna Dr Sarvepalli Radhakrishnan. We also celebrate 15th September as National Engineers' Day since 1968. It is a tribute to Bharat Ratna Dr Mokshagundam Visvesvaraya. Beyond the boarder, we celebrate International Ozone Day on 16th September since 1995. We talk about these three days as they have special significance to VIPNET and its activities.

This month's Curiosity has a special article on Dr Sarvepalli Radhakrishnan, his life and contribution for the humanity; an article on ozone, our regular columns on sky map, quiz, and poem from active club members etc. As you are aware, Government of India has recently unveiled National Education Policy 2020 which has come after 34 years (since 1986). A special article on its salient features and its significance for students, teachers, and parents, has been included. You may also recall that we informed Vigyan Prasar's collaboration with National Mission for Clean Ganga (NMCG). From this month we will have a special article on NMCG covering various aspects of Namami Gange and its activities. In all, we are sure, this month's Curiosity will be a knowledge resource for our clubs. They also have scope to participate in activities and win some exciting prizes.

Since our network is largely dominated by science clubs in schools, especially in

secondary and higher secondary levels, it would be quite relevant to mention about the Vidyarthi Vigyan Manthan (VVM) – a national science talent search examination for the students from class VI to XI. VVM is one of the activities that have not been affected due to lockdown as it was on e-platform since the year 2016. For the 2020-21 edition, there are two exciting changes incorporated in VVM; first, it is going to be an open-book exam and students can appear for the examination from their home and the second, each registered students will get a chance to be a part of a mega national science experiment. Student from class VI to XI should register themselves in VVM through <http://vvm.org.in> and check their aptitude. Beyond the examination, there are three books that are worth reading by everyone, because they cover (i) India's contribution to science; (ii) biography of Sri Venkatesh Bapuji Ketkar, a great Indian astronomer known for his work on Indian almanac system and prediction for discovery of new planet beyond Uranus; and (iii) Indian Almanac and Ephemeris System. Let us all celebrate the true spirit of learning and pay reverence to our gurus for their untiring zeal and dedication in nurturing their pupils.

*Dr. Arvind C Ranade is scientist 'F' and
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Dr S. Radhakrishnan Birth anniversary- A day to honour teachers and mentors

Nidhi Shrivastava

“T

eachers are the backbone of any country, the pillar upon which all aspirations are converted into realities.” This statement of a renowned Scientist, mentor and former president, Dr A. P. J. Abdul Kalam exemplifies the importance of a teacher in shaping the fate of a nation.

Teachers are an indispensable part of a society who mould and nourish an individual’s talent and capabilities. They give children a vision for their future and foster confidence in them to achieve it. The children of today are the pioneers of tomorrow, and the teachers play a pivotal role in development of their personality. The future of an individual depends on the values and skills they acquire during their learning age. The role of a teacher is crucial as they have access to nourish a child intellectually in their most impressionable years — whether it is pre-school, middle school or higher education, extra-curricular streams, sports, or performing arts.

Since ancient times, teachers (*Gurus*) in India were considered next to God, as they have the power to change lives. A teacher’s responsibility is not limited to make a child literate but also to shape their future in the best way possible so that they build a positive personality and inspire the society and the world they live in. It would not be wrong to say that teachers are the real nation builders; they are the destiny makers of the youth and architect of the society.

Nowadays, the image of a teacher has evolved from a strict instructor to a friend, philosopher, or a mentor. They support the student not only at the



academic level but to the mental and emotional level as well. For most of the children, their teacher is the role model and inspiration. A teacher praises his or her students for their success, but at the same time, prepares them for accepting failures. By exposing to the right kind of education and resources, the teachers build creative, independent, informed, incisive, and innovative individuals who can contribute to the society. Teaching is probably one of the most challenging jobs that require multi-facet roles of being a planner, leader, manager, counsellor, evaluator, facilitator, personal engineer, supervisor, motivator, and improviser at the same time.

In India, 5th September is celebrated as the Teachers’ Day to pay tribute to the invaluable contribution made by the teachers to the society. The day is celebrated to commemorate the birth anniversary of the great teacher Dr Sarvepalli Radhakrishnan. He was an educationalist, diplomat, scholar, philosopher, recipient of Bharat Ratna, the former President of India, and above all, a great teacher. He was one of the most recognized and influential Indian

thinkers in the academic circles in 20th century.

Dr S. Radhakrishnan was born to Sarvepalli Veeraswami and Sitamma on September 5, 1888, in a poor Brahmin family residing at Tiruttani village of Andhra Pradesh. His father was employed as a subordinate revenue official under the local zamindar at a meagre salary. Being in the popular temple town and pilgrimage centre, Radhakrishnan’s family actively participated in devotional activities. Due to financial constraints, his father never wanted Radhakrishnan to go to school; instead, he wanted him to be a priest. However, the brilliance and intellect of Radhakrishnan compelled his father to change his decision. Subsequently, he was sent to K.V High School at Thiruttani for his primary education. Later he joined Hermannsburg Evangelical Lutheran Mission School in Tirupati and Government High Secondary School, Walajapet.

Radhakrishnan was a brilliant student who got scholarships throughout his academic career. He completed his high school education from Voorhees College of Vellore. He did his graduation and Masters in Fine Arts from Madras Christian College in 1906 and 1908, respectively. However, he studied philosophy by chance rather than by choice. Due to financial constraints, Radhakrishnan used to lend textbooks from his cousin who graduated in philosophy from the same college. He also then decided to pursue the subject.

He was extremely anguished by the treatment accorded to Hinduism in missionary institutions and developed a quest to study Hinduism, comparative

philosophy, religion, and ethics. Later on, he adopted comparative religion and philosophy as his focus area for study. During his Masters, Radhakrishnan wrote a thesis on “The Ethics of the Vedanta and its Metaphysical Presuppositions” as a strong response to the charges imposed by Christian critics on the ethics of Vedanta system. Radhakrishnan’s non-Indian M.A. Supervisor, Professor A.G. Hogg was so impressed by his thesis that he said, “This thesis which he prepared in the second year of his study shows a remarkable understanding of the main aspects of the philosophical problems, a capacity for handling easily a complex argument besides more than the average mastery of good English.” His thesis got published when he was just 20.

At the age of 16, Radhakrishnan got married to Sivakamu. The couple had five daughters and a son. Due to his family obligations, he could not apply for the higher studies scholarships in Britain after completing his masters. He accepted a temporary position of Assistant Lectureship at the Madras Presidency College in 1909. From the beginning of his teaching career, he was very popular among his students. At Presidency College, Radhakrishnan taught a variety of topics in psychology as well as in European philosophy. In 1918, he joined Maharaja’s College in the University of Mysore as a Professor of Philosophy. By the time, Radhakrishnan’s fame as a scholar grew steadily, and many of his articles were published in reputed inter-



Dr Radhakrishnan with Rabindranath Tagore

national journals. During this period, he also wrote his first book, “*The Philosophy of Rabindranath Tagore*.” His writings were usually centred around the close relationship between religious experience and philosophy.

In 1921, Radhakrishnan and his family shifted to Calcutta (now Kolkata) when he was offered the position of Philosophy professor at King George V Chair of Mental and Moral Science, University of Calcutta. Thereafter, he was invited to Manchester College, Oxford to deliver the Hibbert Lecture on the ideals of life. Later on, the lecture got published as a book- *An Idealist View of Life*. In 1931, he was knighted by George V and addressed as Sir Sarvepalli Radhakrishnan.

He served as Vice Chancellor of Andhra University from 1931 to 1936. In 1936, he was called for the most prestigious international academic position of Spalding Professor of Eastern Religions and Ethics at the University of Oxford and elected as the Fellow of the All Souls College. He was also nominated



for the Nobel Prize in Literature for the two succeeding years, 1936 and 1937. In 1939, Pt. Madan Mohan Malviya invited him to Banaras Hindu University (BHU) to join as a Vice Chancellor, where he served for nine long years from 1939 to 1948. His expertise in his subject, his clarity of thoughts and way of expression made him a much sought-after teacher. But his quality that made him popular was his whole heartedness and his ability to persuade someone to talk. This brought him countless admirers throughout his life.

In late 1940s, his involvement in Indian political as well as in internation-

al affairs increased significantly. After Independence of India in 1947, he was elected to the Constituent Assembly. As an Indian Representative he actively participated in UNESCO (United Nations Educational, Scientific, and Cultural Organization) from 1946 to 1952. Later, in 1949, Dr Radhakrishnan was appointed ambassador to the Soviet Union.

Dr Radhakrishnan was elected the first Vice-president of Independent India. He continued to serve as Vice-President for two consecutive terms from 1952 to 1962. The Indian Government honoured him with its most prestigious civilian award “Bharat Ratna” in 1954. In 1962 he was elected as the President of India. The same year Dr Radhakrishnan proposed that “instead of celebrating my birthday, it would be my proud privilege if September 5th is observed as Teachers’ Day.” From 1962 onwards 5th September is celebrated as a day to pay tribute to our teachers. At the age of 79, Dr Radhakrishnan returned to his hometown Madras (presently Chennai) and stayed with his family until he breathed his last on April 17, 1975.

Throughout his life, Dr Radhakrishnan remained a teacher at heart. One of the most prominent traits of Dr Radhakrishnan was his versatility. His deep philosophical thoughts, oratory, and his compassion for fellow human beings inspired the future generations. He had the wisdom of a sage, detachment of a philosopher and the maturity of a statesman.

Each one of us has been a student at some point of our lives; therefore, this Teachers’ Day let us all pay reverence to our teachers by quoting this shloka,

अज्ञानतिमिरान्धस्य ज्ञानाञ्जन शलाकया।

चक्षुरुन्मीलितं येन तस्मै श्रीगुरुवे नमः॥

(My salute to the guru who abolish the darkness of ignorance with his blessings of knowledge.)

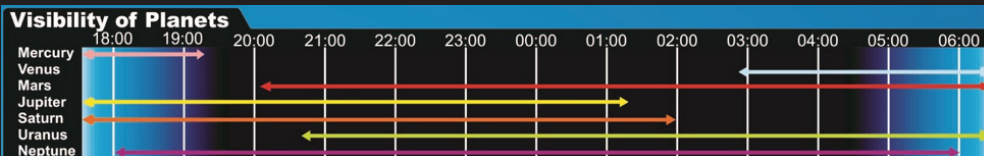
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Sky Map FOR SEPTEMBER 2020

Vipin Singh Rawat

The sky map is prepared as per the coordinates of Nagpur (21.09°N, 79.09°E). It includes constellations and the brighter stars. For viewers south of Nagpur, constellations of the southern sky will appear higher up in the sky and those of the northern sky will appear nearer the northern horizon. Similarly, for viewers north of Nagpur, constellations of northern sky will appear higher up in the sky and those of the southern sky will appear nearer the southern horizon.

THE MAP CAN BE USED AT 10 PM ON 1ST SEPTEMBER, AT 9 PM ON 15TH SEPTEMBER AND AT 8 PM ON 30TH SEPTEMBER.



Astronomical Events of

SEPTEMBER 2020

SEPTEMBER 2 FULL MOON

This phase occurs at 10:53 AM (IST). This full moon was known by early Native American tribes as the Corn Moon because the corn is harvested around this time of year.

SEPTEMBER 11 NEPTUNE AT OPPOSITION

Neptune will be at its closest approach to Earth and its face will be towards the Sun which makes it brighter than any other time of the year. On this date, Neptune will be visible all night long. This is the best time to view and photograph Neptune. Due to its extreme distance from the Earth, it will only appear as a tiny blue dot even if we look through the most powerful telescopes.

SEPTEMBER 17 NEW MOON

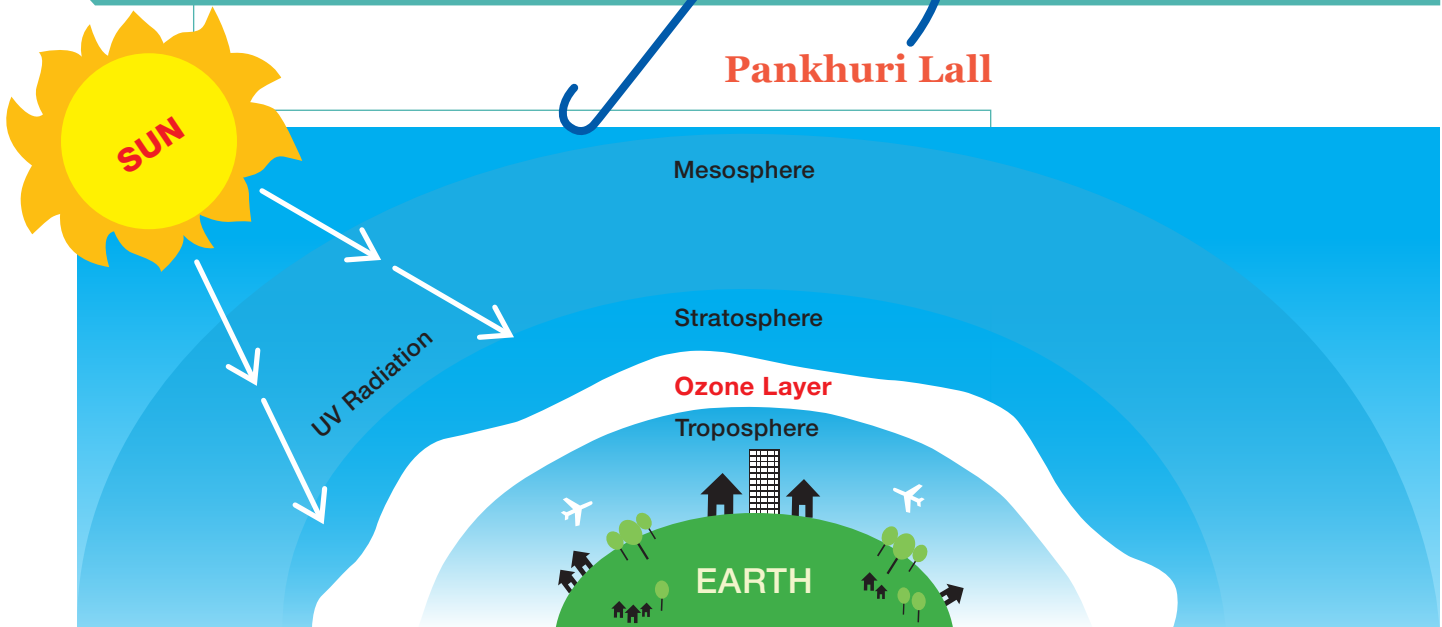
This phase occurs at 04:30 PM (IST). This is the best time of the month to observe faint objects such as galaxies and star clusters because there is no moonlight to interfere.

SEPTEMBER 22 SEPTEMBER EQUINOX

The September equinox occurs at 07:00 PM (IST). The Sun will shine directly on the equator and there will be nearly equal durations of day and night throughout the world. This is also the first day of fall (autumnal equinox) in the Northern Hemisphere and the first day of spring (vernal equinox) in the Southern Hemisphere.

OZONE

Pankhuri Lall



Found on the only known living planet in the universe, we have been attempting to resolve mysteries and amazements that makes life as it is. What is it that makes Earth different from all other planets? What is it that makes life possible only on Earth and not on the other seven planets revolving around the same Sun? From the formation of Earth, to the planet we live in today, the nature carefully put together all the factors that made life possible. One such factor is the Atmosphere. It is magical in itself, that the Earth's shape and distance altogether gave rise to gravity strong enough to keep its atmosphere close to it. The atmosphere is the protective blanket around the Earth, carefully stratified with useful components layer by layer. The layer we live in is the troposphere blessed with elements necessary for survival, carbon, oxygen, nitrogen, etc., extending from 8 to 10 km above the surface. And the layer above it, the Stratosphere, acts as a blanket that protects us from the

powerful harmful radiations from the Sun. And, the 'secret' substance that makes it possible is OZONE!

Chemistry

Ozone is a highly reactive gas composed of three oxygen atoms. It is both a natural and a man-made product and occurs in the Earth's upper atmosphere (the stratosphere) and lower atmosphere (the troposphere). It affects life on Earth in both good or bad ways. Stratospheric ozone is formed naturally through the interaction of solar ultraviolet radiation with molecular oxygen.

How do we know ozone?

When it comes to ozone, there are three breakthroughs that made us aware of ozone, its importance and of its human impact.

First was its very discovery. In 1840, a German scientist, Christian Friedrich Schonbein while experimenting with electrolysis of water, noticed a strong pungent smell which made him curious about presence of a new product. He called this gas "ozone" named after

the Greek verb for 'to smell', Ozein. Schonbein then became the first person to research on the reaction mechanisms of ozone and organic matters. It triggered many researches and innovations on the uses of ozone.

Its disinfectant properties were widely explored and used in processes like drinking water treatment all over the Europe. This property was widely used until its competitor, Chlorine, arrived.

DID YOU KNOW?

Decomposing animal food that is generally thrown away by the butchers, especially in the hot summer season can be restored to its wholesome freshness and purity by employment of ozone!

The next major breakthrough was in the 1913 when French physicists Charles Fabry and Henry Buisson demonstrated proof from measuring the amount of UV Rays in the atmosphere that most of



ozone is found in the second layer of our atmosphere, i.e., Stratosphere. This was later to be called as ozone Layer.

Ozone layer was recognized to play a very important role in the existence of Earth. Life on Earth is possible due to its presence. It acts as a protective layer, as a Sunscreen, saving the world from the harmful radiations of the Sun. The ozone layer acts as an absorber of Ultra violet B rays that, if escaped the atmosphere and reached the surface, would attack the DNA of plants and animals. Had there been no ozone layer, surface life would have ceased to exist.

DID YOU KNOW?

Though we rely on ozone layer to destroy the harmful UVB radiations, a small amount of it is necessary for the production of Vitamin D, vital for human health.

Ozone is highly unstable, and in stratosphere it undergoes continuous formation and destruction under the influence of the UV Rays, thus balancing out the overall level of ozone. This is a natural phenomenon, and like any other natural phenomenon, when this one is meddled with by the humans, the

existence of life is threatened.

This is where, came in the third major breakthrough in the history of ozone. In the year 1975, the World Meteorological Organization conducted first ever assessment of the state of global ozone and about a decade later, in 1984, unusually low levels ozone was detected over Antarctica. This came to be recognized as Ozone Hole. It is not a hole literally, but more than 60 percent depletion of the layer above the area. It was soon realised that the hole is a result of man-made chemicals called the Chlorofluorocarbons, used widely at the time, in aerosol cans, fire retardants and mainly the compressors of all cooling appliances like fridge, AC, among other things.

The Montreal Protocol

The CFC molecules hamper the natural cycle in the ozone layer. Otherwise less reactive, the CFC molecules break down in the presence of UV Rays and release chlorine and fluorine in the stratosphere. This chlorine (Cl) reacts with ozone and forms chlorine monoxide and oxygen. The chlorine monoxide (ClO) then further reacts with loose oxygen (O) and again creates chlorine and oxygen molecules. Oxygen, which is the reason for our existence, present in the Ozone layer becomes a threat to life!

After knowing the harmful effects

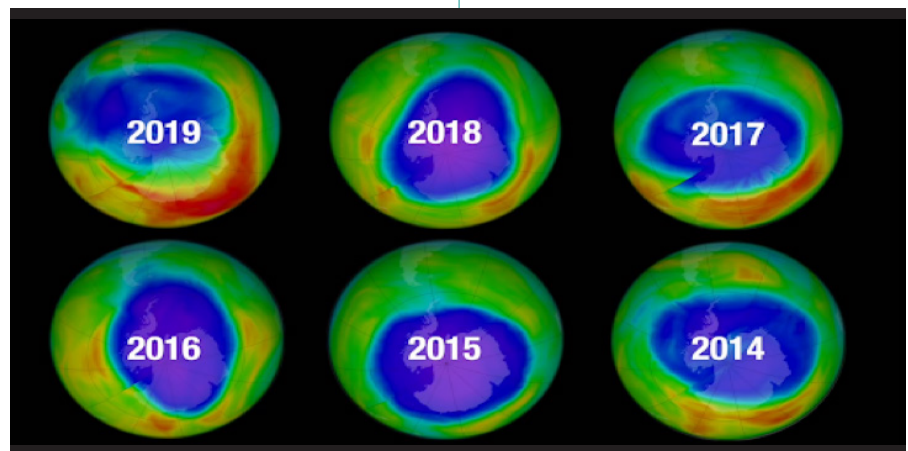
of CFCs, the world needed a bold and quick decision. In 1987, understanding the gravity of the situation and the threat that was lying ahead of life, 197 world leaders collectively initiated a multilateral environmental agreement. This came to be known as the Montreal Protocol that aimed at regulating the production and consumption of nearly 100 man-made chemicals referred to as ozone depleting substances (ODS).

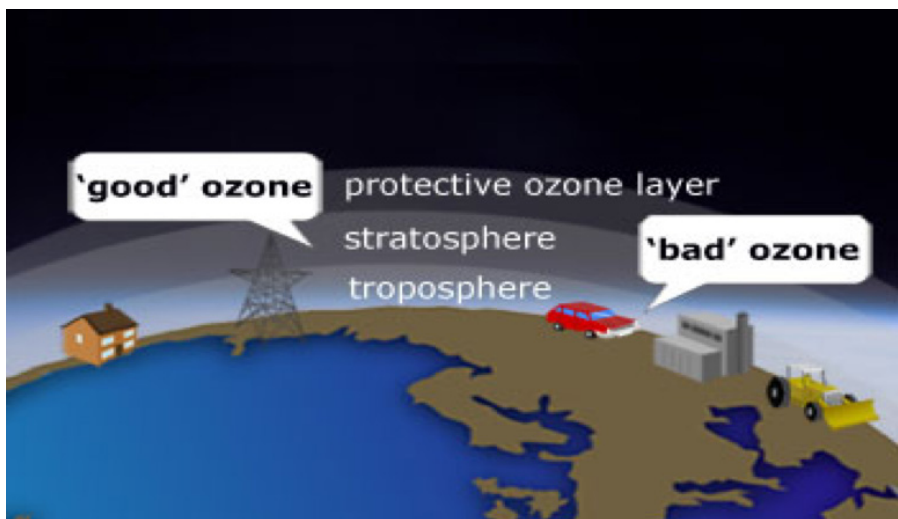
The result of the world coming together for a common cause with strong determination can be seen in recent data released by NASA and US National Oceanic & Atmospheric Administration. September and October months of the year 2019 have recorded the hole over Antarctica to be the smallest since 1982. The hole is shrinking and the Earth is healing its own wound, naturally!

Bad Ozone

But what if ozone skips Stratosphere and seeps into the Troposphere? Ozone in the Troposphere acts as a Greenhouse Gas, responsible for the “Climate Change”. Ground level “Bad Ozone” is a result of unplanned industrialization, urbanization, vehicular and industrial emissions.

It is formed in the lower levels of atmosphere when sunlight either reacts with oxides of nitrogen or infamous Volatile Organic Compounds. Ozone is





the main component of photochemical smog which creates haze in the atmosphere.

Unlike carbon dioxide, ozone is not just responsible for heating up of the atmosphere, it also causes respiratory diseases. What makes ozone extremely dangerous for human bodies is its insolubility in water. Almost all other air pollutants dissolve in water thus

reducing their atmospheric effect; but ozone is different! Being a hyper reactive compound, ozone acts like a bleach in the human lungs. And its long-term exposure can cause chronic respiratory diseases and even premature death.

The Ozone Paradox

It is a fact that ozone levels are found

higher in rural areas than city areas. Being an urban pollutant, ozone settles in rural villages. This is majorly because of lower presence of nitrogen oxides from the industrial pollutants that are present in the cities but are less in the rural areas. These oxides keep the make-and-break cycle for ozone going. Thus though formation is higher in urban settlements, destruction of ozone is also higher there. But in villages, with no source of destruction, ozone accumulates and results into higher levels. This whole phenomenon is known as the Ozone Paradox.

Iodine more than a dietary need?

An interesting new discovery has again shown how nature has the capability of healing itself.

You must have heard about Iodine. It is an element that is found in the common salt. Lack of enough amount of iodine can cause diseases like goitre. This iodine is now known to have been helping in reducing the presence of ozone in the troposphere as per a new discovery.

A recent research published by the PNAS, USA has undertaken an analysis of iodine trapped in the ice in the European Alps. It has shown that levels of atmospheric iodine have tripled between 1950 and 1990. This iodine is destroying the “bad ozone” in the troposphere. Ozone in the lower atmosphere is the main driver of release of iodine into the atmosphere from the seawater. Once released in the atmosphere, this iodine triggers destruction of ozone molecules, thus reducing the ozone in the atmosphere. Basically, ozone gives birth to its own killer! That is the cycle of nature; it knows how to balance itself!

CHECK YOUR KNOWLEDGE

1. The boiling point of ozone is _____
2. Unit of measurement of thickness of ozone is _____
3. Ozone _____ dissolve in water.
4. The Total Ozone Mapping Spectrometer Earth Probe spacecraft (TOMSEP) measures the amount of _____ getting through the atmosphere.
5. International Day for the Preservation of the Ozone Layer is celebrated on _____ as designated by the UNGA
6. Schönbein named it ozone from the Greek verb ozein, meaning _____
7. Ozone is a _____ coloured gas.
8. Ozone is the main ingredient of the haze called _____
9. The Montreal Protocol came into effect in the year _____
10. The Spectrophotometer was developed by _____

Send us the correct answers of the quiz at curiosity@vigyanprasar.gov.in to win exciting prizes.

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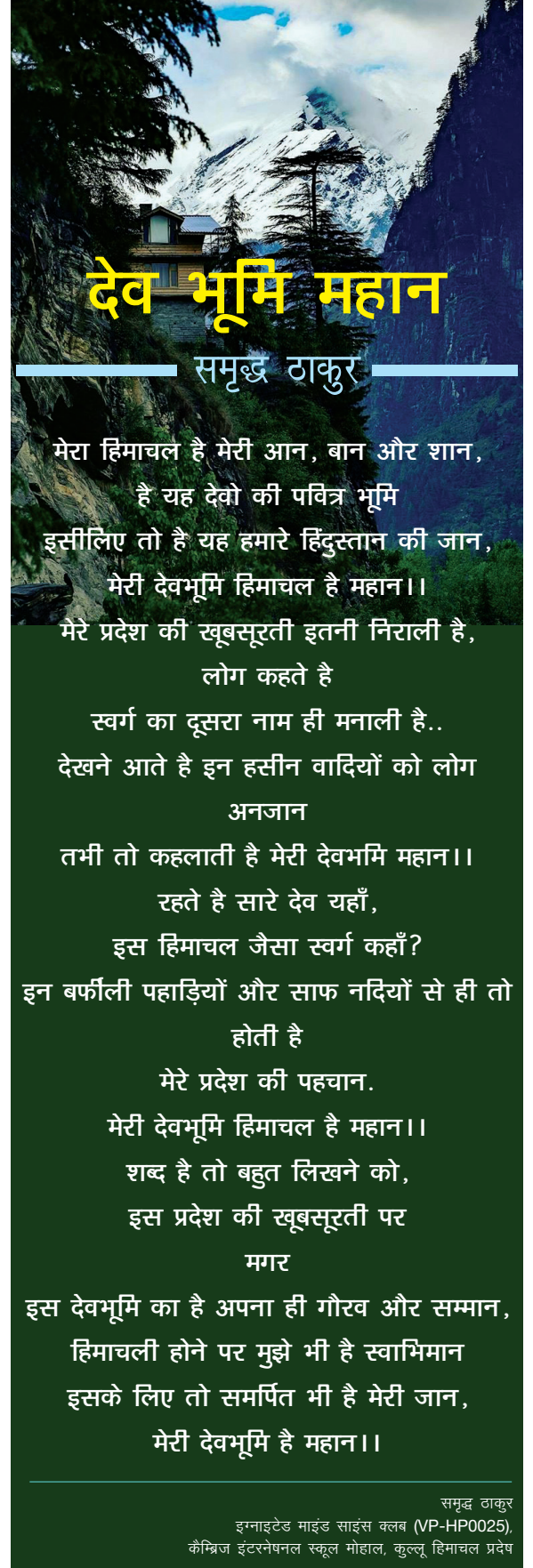
SCIENCE QUIZ

Sachin C Narwadiya

- Which material is known for its highest tensile strength?
A. Carbon Nanotubes B. Graphite Fibres C. Aramid (Kevlar)
D. Stainless steel
- ISRO completed its Mars Orbital Mission (MOM) in record time of _____ months
A. 10 B. 15 C. 20 D. 25
- What is the wind speed range in a very severe Tropical Cyclone?
A. 110-153 Km/h B. 154-177 Km/h C. 178-208 Km/h
D. 209-251 Km/h
- Which factor is responsible for the development of Gout?
A. High Uric Acid Levels B. Low Urea Levels
C. High Cholesterol Levels D. High Glucose Levels
- On how many locations National Mission on Clean Ganga (NMCG) would be supporting surface cleaning of Ganga River by Trash Skimmers?
A. 12 B. 13 C. 11 D. 10
- Which Indian king used the World's First War Rocket?
A. Tipu Sultan B. Shivaji Rajee C. Poras D. Ashoka
- What are the processes which may increase the intensity of Monsoon?
A. Moisture Processes B. Green House Effect C. Ozone Depletion
D. None of above
- How many days in advance can an Extended Range Forecast system predict the weather?
A. 1-3 days B. 5-10 days C. 10-30 days D. up to 6 hours
- How many polymorphs are present in chocolate?
A. 4 B. 5 C. 6 D. 7
- What is the altitude range of Medium Earth Orbit?
A. 5000-15000Km B. 3000-5000 Km C. 6000-8000Km
D. 2000-3000Km

Send us the correct answers of the quiz at curiosity@vigyanprasar.gov.in to win exciting prizes.

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Email: snarwadiya@gmail.com



देव भूमि महान

समृद्ध ठाकुर

मेरा हिमाचल है मेरी आन, बान और शान,
है यह देवो की पवित्र भूमि
इसीलिए तो है यह हमारे हिंदुस्तान की जान,
मेरी देवभूमि हिमाचल है महान।।
मेरे प्रदेश की खूबसूरती इतनी निराली है,
लोग कहते है
स्वर्ग का दूसरा नाम ही मनाली है..
देखने आते है इन हसीन वादियों को लोग
अनजान
तभी तो कहलाती है मेरी देवभूमि महान।।
रहते है सारे देव यहाँ,
इस हिमाचल जैसा स्वर्ग कहाँ?
इन बर्फीली पहाड़ियों और साफ नदियों से ही तो
होती है
मेरे प्रदेश की पहचान.
मेरी देवभूमि हिमाचल है महान।।
शब्द है तो बहुत लिखने को,
इस प्रदेश की खूबसूरती पर
मगर
इस देवभूमि का है अपना ही गौरव और सम्मान,
हिमाचली होने पर मुझे भी है स्वाभिमान
इसके लिए तो समर्पित भी है मेरी जान,
मेरी देवभूमि है महान।।

समृद्ध ठाकुर

इगनाइटेड माइंड साइंस क्लब (VP-HP0025),
कैम्ब्रिज इंटरनेशनल स्कूल मोहाल, कुल्लू हिमाचल प्रदेश

National Education Policy



Ajay Mahajan

The Government of India has recently declared its new education policy that is being discussed in various strata of the society. The eminent academicians and educationalists are analyzing it. The document says, “Providing universal access to quality education is the key to India’s continued ascent, and leadership on the global stage in terms of economic growth, social justice and equality, scientific advancement, national integration, and cultural preservation.”

nation building purpose. It aims at holistic development of Indian citizen and creation of realistic society through their contributions. The Policy leads prime importance to cultural values of India which are incorporated in its rich, diverse, multi linguistic societal structure to be included at relevant stages in the curriculum and motivate the students to learn from it.

Every student has different types of capabilities and aptitudes hidden in them. Keeping this in mind an attempt has been made to formulate a

skill development plan. The findings of various research programmes have emphasized the importance of learning in mother. This aspect has received good attention in the Policy.

Childhood and education

The Policy envisages that the extant 10+2 structure in school education will be modified with a new pedagogical and curricular restructuring of 5+3+3+4 covering ages 3-18.

The first five years are design to build educational foundation and

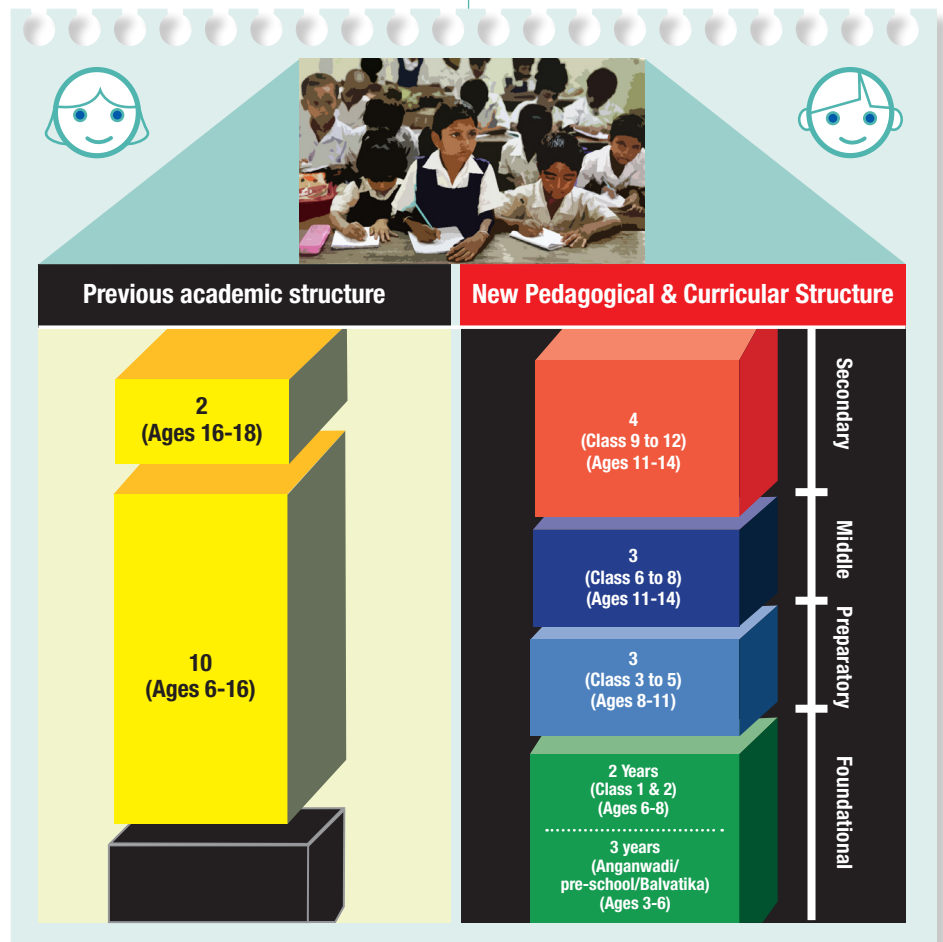


Emotional development

The Policy has laid particular emphasis on developing creative potential of the students. Along with cognitive capacities it has stressed on development of social, ethical, and emotional capacities and dispositions.

Knowledge of India

The Policy has special emphasis on promoting Indian languages, Arts, and Culture. It states, “The preservation and promotion of India’s cultural wealth must be considered a high priority for the country, as it is truly important for the nation’s identity as well as for its economy.” Inculcating scientific temper among students through practical learning, the experience gained by one, developing rational thinking process and basic moral values attached to their creative imagination have been given equal importance. The resulting learning is expected to strengthen the



develop liking towards education. The younger students will be taught of importance of doing things in better ways with moral conduct. The new policy helps in developing traditional Indian values, constitutional values, non-violence, cleanliness, truthfulness, peace, sexuality, empathy, patriotism, democratic approach, justice, freedom, tolerance, equality and brotherhood. For this, students will be asked and given opportunity to read and learn stories from Panchatantra and other Indian ancient literature. The policy also compels to read and understand Indian constitution to become a better responsible citizen.

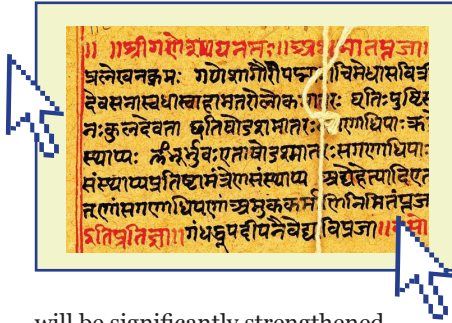
Innovative design of pedagogy

“Studies around the world show one-on-one peer tutoring to be extremely effective for learning not just for the learner, but also for the tutor. Thus, peer tutoring can be taken up as a voluntary and joyful activity for fellow students under the supervision of trained teachers and by taking due care of safety aspects.” This finding has found its way in the NEP which aims to create one-on-one teaching-learning system from fellow student.

The Policy focuses on making the study of mathematics more interesting and attractive, taking into account the various innovative methods of mathematics education and the thought process of computer education. This has led to the emergence of important areas in the future, such as artificial intelligence, machine learning, or data science.

Promoting Indian languages

Considering the importance of Sanskrit language and the wealth of Sanskrit literature as per the Eighth Schedule of the Indian Constitution, it will be taught in a simple manner from school level to higher level. It states, Sanskrit and all Indian language institutes and departments across the country



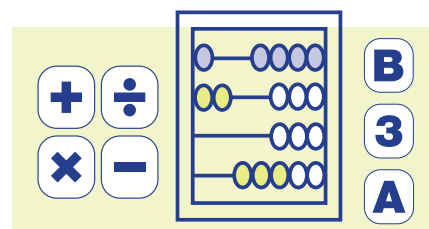
will be significantly strengthened, with adequate training given to large new batches of students to study, in particular, the large numbers of manuscripts and their interrelations with other subjects.”

Education through tourism

The national education policy encourages students to visit various places and travel extensively. The knowledge gained through this activity will be more understandable apart from boosting the tourism industry. It will help in the development of Indian knowledge system along with indigenous and traditional teaching methods at a young age of students. “The Policy recognizes that the knowledge of the rich diversity of India should be imbibed first hand by learners. This would mean including simple activities, like touring by students to different parts of the country, which will not only give a boost to tourism but will also lead to an understanding and appreciation of diversity, culture, traditions and knowledge of different parts of India.”

Basic literacy and numeracy

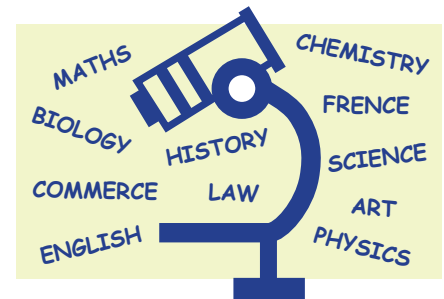
The rich heritage of Indian culture and philosophy, which is influential globally, is indisputable. Ancient educational institutes like Takshashila,



Nalanda, etc. had set high standards of study, teaching and research in various fields. It is a well-known fact that it has benefited scholars from all over the world. This policy is based on education which, along with academic literacy and numeracy, will develop basic academic abilities in students and create a high level of logical and problem-solving ability.

Research-An important aspect

The NEP aims to adopt a holistic approach to enhance research in India. It mainly suggests definite changes in school education. It will help in developing analytical and inquisitive



attitude among students. The inclusion of internship from school level will be useful in developing orientation towards research. The idea of multi-disciplinary ability and holistic learning is suggested as there will be flexibility in the choice of subjects in higher educational institutions. This alone can promote organizational autonomy and innovation. To this end, the NEP seeks to create a National Research Foundation to “fund outstanding peer-reviewed research and to actively seed research in universities and colleges.” It has been suggested that the policy will also help in verifying the professionalism and usefulness of the research done by the students by linking it with private and industry sector organizations.

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Reconstructing the Ganga of the past from Corona Archival Imagery

Peeyush Gupta

Population expansion and human interventions, post Independence, have severely damaged the ecosystem of the river Ganga. Dwindling water levels, pollution, and natural sediment transport have further threatened its ecosystem. The restoration of heavily degraded large river such as Ganga to a reasonable ecological functionality is a challenging prospect. However, given the past six decades of fast development, efforts to restore the Ganga to its original condition are faced with a fundamental question: **What was the original state of Ganga?** Answering this question will require some knowledge of the former course of the river and of the farming and urban density of the surrounding plains before the impacts of human disturbance could be explored.

The Corona reconnaissance satellites, developed in the immediate aftermath of SPUTNIK, are one of the most important space vehicles ever flown, and that comparison includes the Apollo spacecraft missions to the moon. The ingenuity and elegance of the Corona satellite design is remarkable even by the current standards, and the quality of its panchromatic imagery in 1967 was almost as good as US commercial imaging satellites in 1999. Yet, while the moon missions were highly publicized and praised, the CORONA project was hidden from public view; until February 1995, when the project details were declassified, making the design details, the operational description, and the imagery available to the public. **The Corona spy-satellite**

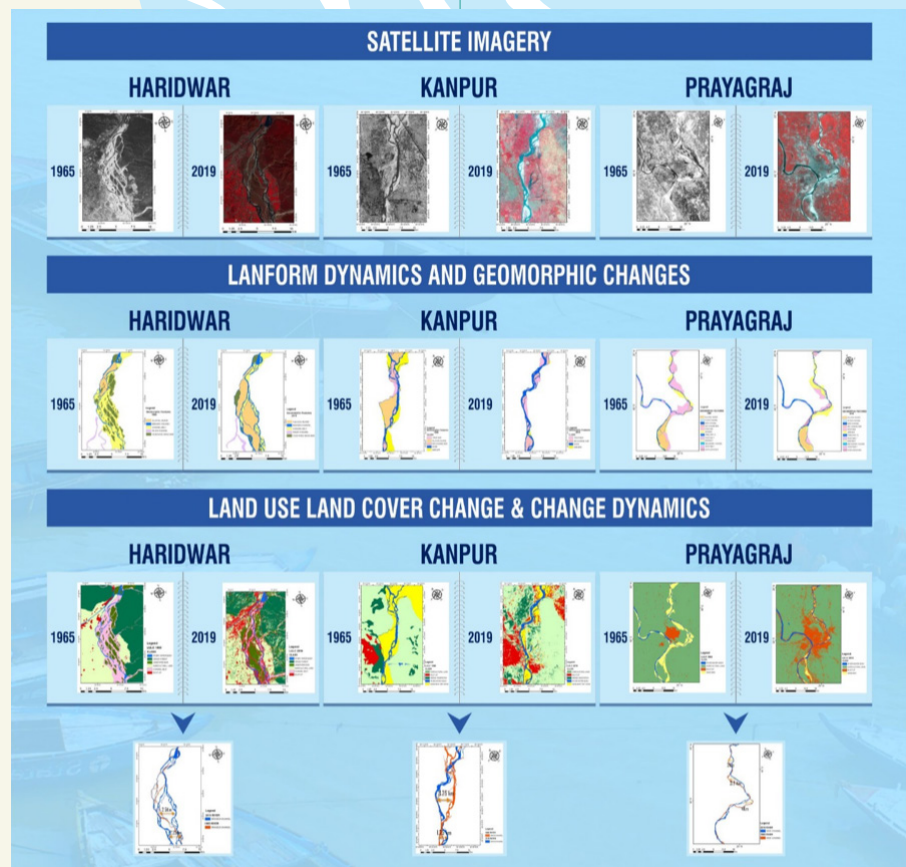
program collected a large number of earth observation photos in the 60s (1958-1972) by the CIA and having **resolutions from 1.8 to 7.5 m**. Corona images were all panoramic in nature. These photos, now declassified, offer a unique view of the Ganga at the very early stages of intense development and thus before the worst ecological damages occurred.

The desired Ganga river length is now covered by the archival imagery with +/- 20 m positional accuracy. Corona archive contains over **8000 images of Ganga basin**, and offers

us a unique view of the Ganga predating the ecological damages. **The image data is valuable reference for the current and future research work related to Ganga river projects.**

It covers more than **800-km-long** river stretch which is different for the conventional piecemeal application of the resource.

The advent of satellite remote sensing has provided a huge opportunity to geomorphologists to study the temporal dynamics of large rivers. A river is a natural water way, which flows across the landscape from higher to lower



(Source: NMCG)

elevations, and it is an important component of the water cycle. The rivers are generally fed by precipitation through surface runoff, groundwater and release of stored water in natural reservoirs such as glaciers. But, these rivers are also responsible for natural hazards like bank erosion, flooding and lateral shifting. Further, natural as well

as anthropogenic factors can alter river channel position and form, flow rate, and bank line characteristics albeit at different spatial and temporal scales. River dynamics is one of the major problems in rivers draining the Ganga plains.

Geomorphological mapping leads to a number of applications to

basic scientific research essential to the continued growth and development of geomorphology. Geomorphic mapping is the prime objective of this study. The already available **geomorphological data** for the recent time gives the opportunity to perform the change detection in terms of geomorphological metrics, to quantify the anthropogenic impact on the river Ganga. In spite of its enormous value of scientific application in terms of very high spatial resolution, its application has been limited due to several problems with the positional accuracy of these images.

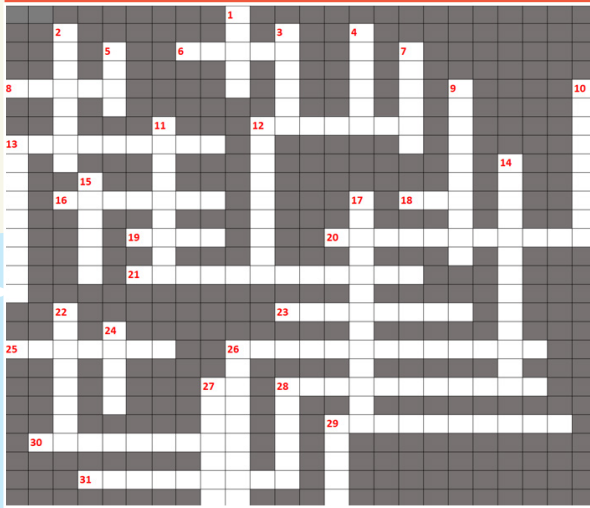
An innovative combination of GIS and remote sensing methods will be developed to complete the complex processing required to make accurate digital maps from these satellite images.

Comparative study of Land use/land cover dynamics and changes and landform dynamics and geomorphic changes are shown for the area of Haridwar, Kanpur and Prayagraj.

GIS mapping project on **“Reconstructing the Ganga of the past from Corona archival imagery”** is executed by IIT Kanpur under Namami Gange flagship programme. Deliverables of Corona project would be to make all processed Corona images available for upload on Bhuvan Ganga Geoportal, to develop an atlas of the Ganga River showing a comparison between 1960s and present; establish the reference condition of the Ganga river; and quantify the changes in morphological characteristics and land use/land cover within the Ganga valley between 1960s and present. Based on all these input, a policy document on ‘desirable’ land-use within the Ganga valley will be developed.

Er. Peeyush Gupta, (Nodal officer for the project), is Asst. Real Time Information Specialist, National Mission for Clean Ganga, Ministry of Jal Shakti. Email: peeyush.gupta@nmcg.nic.in

NAMAMI GANGE CROSSWORD:



DOWN:

1. Caused by heavy rainfalls
2. Precipitation mixed with pollution, which is harmful to environment
3. Another name for waste
4. One of the major

ACROSS:

6. The layer of atmosphere which protects from UV rays
 8. Ganga river in Nepal
 12. An area of land where wild animals are officially protected
 13. A river or stream flowing into larger river
 16. Area occupied by a community or species
 18. A river usually meets in the end
 19. Considerable body of inland water or an extended part of a river
 20. A place for the cremation of the dead
 21. Study of Aquifers
 23. A site that is especially designed to dispose of solid waste
 25. National aquatic animal of India
 26. Pollution caused by human activities
 28. All the physical surroundings on the earth
 29. GIS is _____ Information System
 30. A pond, lake or basin where water is collected or stored
 31. Liquid waste such as sewage from industries
5. A small vessel-shaped body for travelling on water
 7. It is essential for combustion
 9. Unwanted substances in air or water
 10. A community of organism that depends upon each other and the environment they inhabit
 11. A specified area where animals live in natural environment protected and safe
 12. This can reduce solid waste
 13. Affect clarity of water
 14. Plantation activities carried out on larger scales
 15. A tributary of river Ganga
 17. Used by plants/algae for photosynthesis
 22. Often added to drinking water
 24. River banks used for bathing and puja etc.
 26. Nation Mission for clean Ganga has been designated with this status
 27. Underground water reserves
 28. Number of states in Ganga River basin
 29. India's largest river

Send us the correct answers of the crossword at curiosity@vigyanprasar.gov.in to win exciting prizes.



VIDYARTHI VIGYAN MANTHAN 2020-21

INDIA'S LARGEST SCIENCE TALENT SEARCH EXAMINATION FOR NEW INDIA USING DIGITAL DEVICES

Vidyarthi Vigyan Manthan (VVM) is an initiative of Vijnana Bharati (VIBHA), in collaboration with Vigyan Prasar, an autonomous organization under the Department of Science and Technology, Government of India and National Council of Educational Research and Training (NCERT), an institution under the Ministry of Education (earlier known as Ministry of Human Resources and Development). VVM is a national program for popularizing science among school students of standard VI to XI, conceptualised to identify the bright minds with a scientific aptitude among the student community.

STRUCTURE OF VVM (JUNIOR AND SENIOR):

- 1. School Level Examination:** VVM is a unique online examination to be conducted at national level. The registered students will take the exam using his/her own digital device namely a laptop/ tablet / smart phone (mobile with any OS - Except Apple devices) with internet connectivity. Level-I (School Level) examination will be conducted nationwide, on 29 and/or on 30 November, 2020 anytime between 10:00am to 08:00pm. Evaluation of student will be based on their individual performance at every level.
- 2. State Level Camp (SLC):** Top 20 rankers per class per state will be identified to participate in the one or two days State Level Camp (SLC). The camp will be organised anywhere within the state.
- 3. National Camp (NC):** From each State Camp, top two students from each class i.e. total 12 students per state, will be invited to a two-day National Camp.

SYLLABUS FOR VVM:

CONTENT	CONTRIBUTION	MARKS	DURATION	CURRICULUM
Indian Contribution to Science	20% (20 questions) [1 Mark each]	20	30 Minutes	VVM Study Material*
Life story of Vyankatesh Bapuji Ketkar and his contribution in the Field of Measurement of Time	20% (20 questions) [1 Mark each]	20		VVM Study Material*
Science and Mathematics from Text Books	50% (50 questions) [1 Mark each]	50	60 Minutes	NCERT Curriculum
Logic and Reasoning	10% (10 questions) [1 Mark each]	10		General Reading

* VVM Study Materials will be made available in PDF format on <https://vvm.org.in> by 20 August 2020. No printed copies will be provided.

Registered students will be a part of India's 1st Mega Science Experiment. Students will get to know about the nutritional value and environmental impact of our food habits.

KEY POINTS:

Eligibility	Students from classes VI to XI
Language of Exam	English, Hindi and 10 major regional languages
Exam Venue	Open Book Exam (Students will write exam from their home)
Fee	Rs. 100/- (without late fee), Rs. 120/- (with late fee) through Online Payment
Registration	Online on https://vvm.org.in



VIJNANA BHARATI
A-4, First Floor, Gulmohar Park,
August Kranti Marg, New Delhi - 110049



VIGYAN PRASAR
A-50, Institutional Area, Sector-62,
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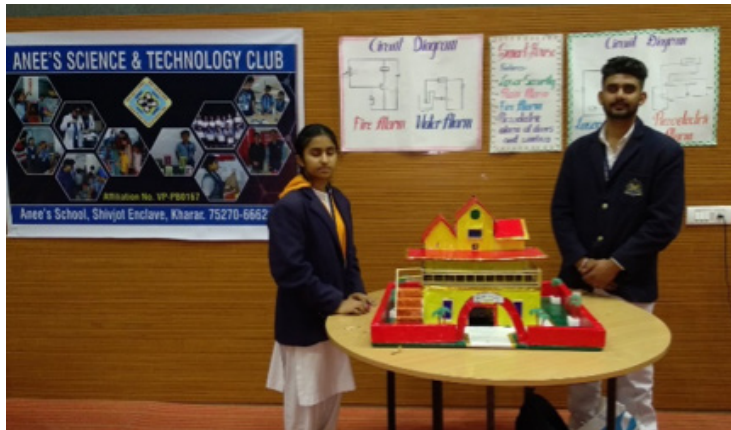


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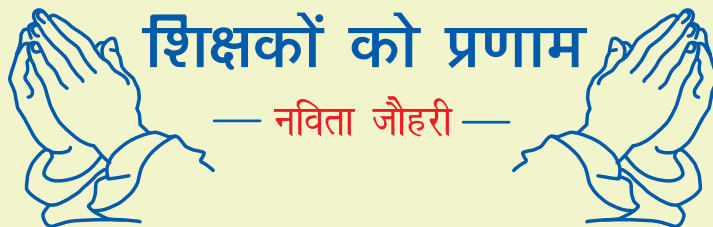
Inter-school Science Model Competition

On the occasion of National Science Day on 28th February, the Anne's Science & Technology Club, Kharar (VP-PBO167) conducted an Inter-school Science Model competition. Students prepared their science model on pre-decided themes- Resource Management, Waste Management, Robotics, innovations for Sustainable Development and 5R's. Around 50 students from nearby schools presented their model at the exhibition.



Annular Solar Eclipse -Awareness Programme

Dr. Triguna Sen Science Club, Kolkata (VP-WBO090) conducted an awareness programme on 21st June 2020. An online discussion was carried out with the students of Jadavpur Vidyapeeth to discuss the reason of eclipses, types of eclipses, myths associated with eclipses and the precautionary measures taken to observe the eclipse.



सम्मान के शिक्षक हैं अधिकारी,
हम सब इनके हैं आभारी,
वंदन नमन सदा उन्हें हमारा,
जीवन में करते उजियारा।

कर्णधारों के भविष्य को,
प्रदान कर रहे सुदृढ़ नींव जो,
ऐसे शिक्षकों का करते हम वंदन,
करते हैं उनका अभिनंदन।

विद्यार्थियों को दे रहे ज्ञानधन,
बाँट रहे शिक्षा प्रसाद जो पावन,
निस्वार्थ भाव से बढ़ रहे आगे,
ताकि भविष्य सुनहरा जागे।

शिक्षक रहे हों राधाकृष्णन,
या फिर डॉक्टर अब्दुल कलाम,
ऐसे प्रबुद्ध शिक्षकों को
सदा हमारा है प्रणाम।

नविता जौहरी
के-7, फारच्यूनएन्क्लेव
कोलारोड, भोपाल (म.प्र.)
पिन-462042



Craft from waste

Madam Curie Science Club, (VP-PY0008) conducted a workshop to reuse waste papers for the students of Mettupalayam Government Higher Secondary School. The club coordinator discussed several ways to create crafts from wastepaper collected from the school campus.

Infectious Disease Awareness camp

An awareness camp was organized by the Institute of Rural Health Awareness & Homoeopathy Science Club, Hoogly (VP-WB0105) for the local residents on their campus. In the camp the residents were informed about the types of infectious disease, prevention and precautionary measures to be taken to protect themselves and their family.



Demonstration Session on “Science of Mixtures”

Ryan Science club, Raipur (VP-RJ0111) conducted an online demonstration session on 22nd July 2020 for the students of Ryan International School, Mansarovar, Jaipur. The participants explained the mixtures, solutions, colloids, suspension, etc., using the basic materials available at home.

CURIOSITY ACTIVITY STARS!

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