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EdUREKA

Education for Spirit of Science

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New Education Policy NEP 2020

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Education for Spirit of Science

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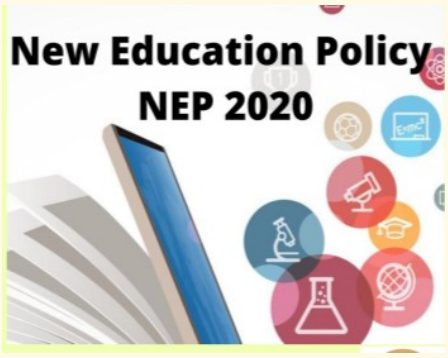

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From Editor's Desk....

Notwithstanding the initial fear and subsequent panic, world has decided to live on along with the Covid-19 pandemic and accordingly has resumed its original activities with due precautions and fervor. No doubt prevention is the key to fight against this disease. Now it has become evident that even if the vaccine becomes available, providing the same to every person will be a herculean task. In view of this, the most rational approach is to improve our immunity against this disease which is under intense investigation.

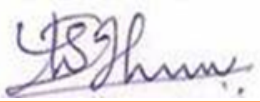
Taking Covid-19 thus to its stride world has squarely greeted the announcements of Nobel prizes for this year (2020) which have been timed much earlier than the schedule every year. So we have new Nobel laureates for Medicine and Physiology (Drs. Harvey J. Alter, Michael Houghton and Charles M. Rice) for the discovery of the hepatitis C virus, for Physics (Roger Penrose, Reinhard Genzel and Andrea Ghez) for the discoveries that improved our understanding of the universe and for Chemistry (Emmanuelle Charpentier and Jennifer A. Doudna) for the development of genome editing technique called Crispr-Cas9. The Nobel committee said that all scientists had done outstanding contributions to save mankind from disease, enhanced our understanding as regards how and why the universe works as well as how to make genes work better. This year's prizes will be given in virtual events shortly.

Soon after this, we witnessed the announcement of Bhatnagar awards for young scientists and engineers in different fields. As a mark of their continued legacy these awards are presented every year to young scientist for their outstanding contribution in various fields. These awards decisively facilitate the implementation of their present research agenda as well as that of prospective research schemes for all the remaining years of their professional lives.

Without doubt, awards and prizes for recognition of work plays significant role in carriers of scientists. But there are quite a few individuals whose work do not get its due visibility and therefore is not recognized at correct time. Some of them do get disheartened due to this and quit working while others refuse to get bogged down and fueled with their indomitable spirit continue with their work till it achieves its intended goal.

Let us therefore commit ourselves to the work that have societal relevance and aspire that we will have an Indian scientist in the list of Nobel Prize awardees one day.

Wishing everybody a very happy new year 2021 in advance.



NEW EDUCATION POLICY 2020

Government of India has recently announced new education policy after much debate and inputs from different experts. The National Education Policy 2020 (NEP 2020) has come up with a new narrative which consists of several innovative ideas for the betterment of Indian education system and has suggested some radical measures, which if properly implemented would auger well for the future of education in our country. NEP 2020 is the third policy on education since independence,after NEP 1968 and NEP 1986. Earlier policy (NEP 1986) focused on "Operation Black Board" to strengthen primary education in the country. NEP 2020 lays emphasis on skill oriented education to develop in the students, skills which are needed to meet the challenges of the 21st century.

Major thrusts of NEP 2020

There are five major aspects of the policy which can transform education in the country and which has to be seen in the light of the reconfiguration of the school curriculum from the present 10+2 pattern to 5+3+3+4.

The different stages of a student's school education have also been roughly demarcated as follows:

3-8 years	**Foundational stage**
8-11years	**Preparatory school stage**
11-14 years	**Middle school stage**
14-18 years	**Secondary stage**

Photo Curtsey: https://www.education.gov.in/

Key features of the new education policy:

1) **Focus on foundational learning** which will help the preprimary and primary school students in the age group 3-8 years, to read and solve basic arithmetic problems. These basic skills acquired in the early stages of education will help the students to learn better in the higher classes and enable critical thinking and problem solving. The acquiring of foundational skills i.e. word recognition and oral reading fluency will be accelerated by the setting up of a National Mission of Foundational Literacy and Numeracy (FLN).
2) **Focus on universal access to pre-primary education to all children** as pre-primary education in the early years of a child serves as a building block to acquire FLN skills. In the past also, a lot of importance has been given to making primary education compulsory for all children.
3) **Focus on proper key stage assessment to measure the learning outcomes** of students in classes 3, 5 and 8. A national level assessment center will be set up to frame guidelines, norms and standards for evaluation of students' learning. The norms will be applicable to schools across all school boards in the country. There will be board examinations at the end of the academic year for classes 10 and 12 with emphasis on understanding of concepts, analytical and logical thinking and experiential learning. This will discourage rote learning and stereotype examinations.

4) **Focus on Increased use of Technology in Education** The use of Educational Technology (Ed. Tech.) in classroom teaching will be increased and Digital learning will be an integral part of education. With most sectors especially the service sector moving into the digital platform, we need to create tech-enabled students. Ed. Tech enables students to learn at their own pace and offers remedial help to students requiring additional help.
5) **Focus on creating a favorable environment for the private school sector for integration into the mainstream of education.**

   Nearly 50% students (around 12 crores) in India attend private schools as their parents believe that they provide a better learning environment. Private schools should be supported and integrated into the formal education system.

   Thus all in all, NEP 2020 focuses on universal access to education, skill development, learning of life skills, analytical and logical thinking, experiential learning and increased use of technology in education.

Salient features of NEP2020

- NEP 2020 offers an alternative to the present examination centric and rote learning model wherein syllabus completion and pass percentages are the only goals to be achieved.
- NEP 2020 aims at dismantling the present rigid divisions between curricular, co-curricular and extracurricular activities in educational institutions and seeks to bring in an element of flexibility. Thus the contours of education will be redrawn to provide a well-rounded education.
- NEP 2020 aims at a change from overregulation and complex and outdated norms to a simplified structure.
- All stake holders-teachers, students, parents, government, funding agencies and policy planners will be involved in decision making at all levels.
- Concerted efforts will be made to enable access to education to the socio-economically sections of society.
- In the revamped curriculum, students will have exposure to at least one vocational skill which will help him to seek gainful employment.
- Stringent action is advocated against substandard institutions indulging in unethical practices.
- Investment in research is expected to be increased to power India's journey towards the 4^{th} industrial revolution. Emphasis will be on creation of excellent research centers and improving the quality of research to make India a global hub of knowledge & knowledge based economy.
- The present 3 language formula (Regional language, Hindi and English) will continue to be implemented in all states, with the use of the mother tongue in the early years (Grades 1-5) but with a strong dose of English so that students are fluent in the language by the age of 10. This is a welcome step as English is the dominant language worldwide especially after the IT revolution. The study of all languages especially the classical languages will be encouraged.

Conclusions

NEP 2020 holds out promise of sweeping changes in Indian education. If the policy is implemented in toto, Indian education will go miles ahead. Teachers and educators have a special responsibility to ensure the proper implementation of the policy. Teacher organizations will have to play a major role in the transformation of the Indian educational system. NEP 2020 can truly be a renaissance in Indian education.

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LONG TERM IMPACT OF NEW EDUCATION POLICY 2020

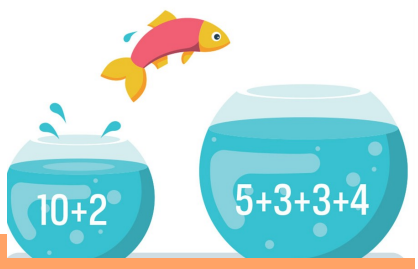
It has been more than three decades since there is any foundational modification in the educational system of India. Technological advancement with the advent of internet has changed the whole world but the ladder to reach that advancement was not modified. Finally on July 31, 2020 a new era has been opened as National Education Policy 2020.

Earlier educational system was working on the guidelines issued by NEP 1986 and RTE act 2009 but a lot of lacunae were found in the system which were receding it from the universal education goal. A dire need for modified educational system was felt. A system which will take India to the goal of self-reliance and success in global competitiveness. Working age population and its potential defines the growth of any country. In India about 60% of population lies in the age group of 10 to 60 years and for success, they should be fully equipped with relevant skills which should be taught to them as foundation in schools. The policy aims to increase public investment in education from 4.4% of India's GDP to 6%, and more than 290 million students life will change for better if this policy is implemented with the thought behind it.

The National Education Policy 2020 (NEP 2020) has addressed several voids in the current education system. It takes forward our education system towards International standards and it will have significant impact on the future of the Indian education.

Image curtsey: https://www.indianera.com

- First and most important impact will be the availability of schools to everyone with multiple reform for example introduction of Preprimary unit at all levels of Government or private run schools, to bring back school drop outs to mainstream education through NIOS and SIOS, formation of school complexes to share teaching resources, inclusion funds for backward areas and disadvantaged regions or it is home schooling for divyangs.
- Another major impact will be on curriculum structure and it's redesigning. Current 10+2 structure will be replaced by 5+3+3+4 structure. The primary focus will be on language and numeracy foundation in formative years of learning. This 5+3+3+4 structure corresponds to ages from 3 to 8, 8 to 11, 11 to 14 and 14 to 18.
- According to NEP 2020, studies will be in mother tongue or home language and gradually child will be introduced to other Indian and foreign languages. There is special emphasis on Sanskrit language and whole new interactive curriculum will be set for it. Also, yearlong projects on classical languages will enhance efficiency and also will connect child to Indian cultural roots.
- To understand the learning levels of student's examinations will be conducted for grade 3, 5, 8 along with board exams at 10^{th} and 12^{th} grades by appropriate authorities of state.
- To enhance reading and learning level of students and general public formation of National Book promotion policy is very thoughtful. School and public libraries will be revamped along with digitalization.
- Flexibility in choosing courses is yet another sought after a thing since decades. NEP 2020 allows students to choose options in various subjects as per their interest and can continue it till their university education. For this high level Multidisciplinary Education and Research Universities will be set up.
- Digital and online education will be promoted on large scale so that class resources can be available to students throughout India. Classrooms will be digitalized in phased manner.
- NEP 2020 focuses on holistic development of child and is not depending on mere marks. The overall learning of child in all fields may be performing arts, sports, academics, vocational education is given equal importance.



- There is a great emphasis on Teachers education and improvement. Four year B. Ed program will be mandatory by 2030. NTA scores will be considered in the recruitment process with compulsory demo lectures.
- Another major reform is in the regulation and accreditation system is introduced. A four tier system for regulations, monitoring, and accreditation will be formed. A new department called State School Standard Authority will be set for all regulations and new school licensing. Schools need to disclose all the relevant information as decided by SSSA on their websites and SSSA website for public.

It's desirable that Ministry of Human Resource Development MHRD) be re-designated as Ministry of Education (MoE) to bring the focus back on education and learning.

Availability of teaching resources and textbooks in mother tongue teaching, availability of skilled teachers who understand thought behind NEP 2020 and removal of red-tappism in the regulation and monitoring system, proper coordination between state run and private schools are some of the challenges that Government may face in the long run.

Although implementation of NEP 2020 in true spirits will take time but we hope that it will change the face of Indian Education system and will make it par with International standards.

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Photo: Kerala student finds innovative way of e-learning to overcome poor connectivity. Photo Curtsey: Shakir Husain

LOCKDOWN EFFECT ON MOTHER NATURE

COVID-19 pandemic doesn't need any introduction at this stage as it has created panic situation all over the world for last 08-10 months. All the information related to this disease have become available on everybody's fingertips. This is a transmissible disease that mainly infects the individuals when the person comes in (close) contact with the infected person (s). External or internal body fluid such as cough, sneeze, saliva, etc. from the infected patients can be source of infection. Covid-19 also can be communicated to a healthy person through any object (s) that carries the virus. Therefore, social lockdown is highly helpful to act as one of the preventive measure to tackle the spread of infection.

Social lockdown is imposed on people to allow them to leave their homes as infrequently as possible to shop for basic necessities such as food, to exercise each day, to collect medication or care for a vulnerable person, and to travel to and from work, but only if this is absolutely necessary and cannot be done from home. Social lockdown is a direction for restriction of inter-individual physical interaction in order to avoid the person and outer environment. It is slightly different from curfew because, under this condition, minimal emergency public movement is allowed. Emergency service providers such as people form medical care, food security, general security and medicine supply chain are usually allowed during the social lockdown. However, under a strict social lockdown for a few hours or days, few emergency services such as food and medical supply chains can also be closed. It clearly indicates that mass or community movement and interactions are not allowed during the lockdown period. The strict regulatory mode is focused to forbid two people to come in close contact with each other during the lockdown.

The development of a vaccine takes usually 12–18 months due to different phases of its trial. The world is eagerly waiting for a vaccine and hopefully, it will be available soon. To come up with specific vaccines or drugs, research institutions are working 24/7. Mother Nature usually follows a natural transformation process to give checkmates to many of the environmental extremities in order to save the planet. Many species become extinct and many have occupied the world following such climatic events. It leads to stabilizing the world as a unitary ecosystem. Lockdowns in many countries have some surprising positive side effects as evidenced by the reduced Nitrogen dioxide (NO_2) emissions. Nitrogen dioxide emissions are one of the major air pollutants emitted from industrial and vehicular operations. As both the above operations have come to a nearly total halt for >100 days in many counties during this pandemic, NO_2 emissions are diminished.

Nature and its natural resources are overexploited by humans for their restrictive exploitation. In spite of regular international and national meetings that are held on our planet expected results at the field level are always not satisfactory. The world has witnessed many such intra and international gatherings without any substantial results to save the environment. However, COVID-19 induced lockdown, pushed one-third of the human population into an indoor and human beings which has practically prevented them from doing anything to save the environment. But they now are busy in discovering how to get rid of the virus that has caused a pandemic. Probably, the Mother Nature is trying for its revival now that human race has stopped its degradation, and that is the greatest contribution of the human race ever towards nature (i.e. mankind has been doing a great job to revive nature by doing "nothing"). The world as an ecosystem belongs to every organism but was dominated by humans, and taking the advantage of their functional absence, wild animals are found moving across the roads, cities, and other human habitation. People are observing spontaneous changes in nature witnessing its self-revival. Air Quality Index (AQI) is a pretty robust metric which reflects to be changing in favour of the Mother Nature.

COVID-19 quarantine has locked humans at their home; it gives wildlife a rare opportunity to lead a tranquil live. Free movements of wildlife are observed in human-dominated areas. Wildlife Institute of India issued real-time data using an app —Lockdown Wildlife Tracker to share comfortable wildlife movement in human restricted zones. This free app makes it convenient to keep track of wildlife movements (captured and shared by anyone in the world) due to lockdown, and all data in the app will be stored and will be openly available for scientific research, education, and conservation.

Never before in recorded history, have living people been feeling the same danger and the same needs- only basic foods. No rich, no poor, all are equal now. Best of all, the pollution level has come down to the lowest level ever. Nobody in last thousand years could ever imagine that Mount Everest (Nepal) will be visible from Bihar (India) with bare eyes (about 250 km), Nilkantha Peak (Indian Himalaya) from Uttar Pradesh (about 200 km), Dhauladhar Glacier (Indian Himalaya) from Punjab (250 km). These appear more fictional than science fiction but doubtlessly true. The sky is smiling, the moon is glowing, the sunlight has become pure, and raindrops are free from acid. Mother Nature has regenerated in only 60 Earthly days, which was unthinkable in the post-Industrial revolution world.

All the above proposals should be integrated with the global financial institutions and United Nations such that every country must have to follow the norms for getting future aid and loan.

Under this perspective, let us propose some norms for the peaceful coexistence of Nature with finite resources. This will lead to a better world for future generations. Every year all human activities should be under lockdown for a few days in order to help regenerate Mother Nature and following constructive measures can be taken:

- Children across the world should be taught to protect Nature as an essential part of the course curriculum from school days.
- Population growth rate must be compulsorily brought down to less than 1% in all countries in order to maintain a sustainable balance.
- Luxury goods should be highly taxed in every country, if not possible to stop production altogether.
- Production of weapons of mass destruction, must be totally banned.
- The traditional idea of health and hygiene should be modified in order to boost immunity. The easiest way without any cost to boost immunity and good health is to practice Yoga and Meditation and introduce scientific food habits. So, Yoga and Meditation should be introduced in school courses as a mandatory subject. Wild food habits must also be banned.

Photo: Air quality during the lockdown at India gate Image curtsey: https://www.cnbc.com

Human beings have already crossed the tolerance limit of Mother Nature. We shall have to face her furies frequently in her own elegances unknown to us and unmatched by human pride on technology. So, obey the Natural Order, maintain Mother Earth, or get prepared to perish soon. The thick black clouds of Corona virus have enveloped every part of the world, spreading its aura of terror. And until we wait for the black clouds to clear and the bright yellow sun rays to touch our lives, we must look for the silver lining. In this case, there is a lot of positivity around us, despite the panic and loss through COVID-19.

Conclusion:

After COVID-19, nothing will remain same. Yet life can be better. We have a moment to think and reflect. Maybe we don't need as much stuff as we thought we did. Perhaps we can fill our lives with real closer relationships, with happy moments, with lots of creativity. Perhaps we recognize and understand what really counts in our lives: being safe, being happy and being free. When we overcome COVID-19, we should not lose what we have won. We should do everything possible we can, to stabilize our environment, our support system. We definitely need to think positively about how we can restore nature by living life differently. We have the Paris Agreement, to stabilize the climate change, on keeping global temperature from rising more than 2°C above pre-industrial levels. These demands into reducing greenhouse gas emissions to net-zero as soon as possible. For stability of biodiversity and ecosystem, and to halt the loss of biodiversity we do need such a binding target. Governments must work hard to achieve them. During COVID crises, we have an important window right before us. COVID-19 pandemic can thus be considered as a recovery mechanism with which we build resilience against future shocks and we can create a healthier ecosystem. The year 2020 thus can strongly be considered as a super year for Mother Nature.

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GOING BACK TO VILLAGES: REVERSE MIGRATION DUE TO COVID PANDEMIC

After realization of failure of city administration taking care of peoples during pandemic times, we witnessed mass migration of people from urban area to rural India. This is called one of the biggest mass migrations of people since partition. This has highlighted the drawbacks of urban living and resulted in moving peoples to rural India. This can be called as forced migration but has raised serious questions on our so called development theories.

Going back to villages was the famous slogan used many times since independence by Mahatma Gandhi and many other subsequently but it has come to reality due to the lockdown situation created by the Covid-19 pandemic. This situation has opened up new opportunities for development of rural India. Now it is time to think on development of infrastructure in rural India so that the migrants will be duly employed in rural areas themselves. For this to happen, technology driven efforts are required so that the people will not return to the cities.

Government of India has also realized this and decided to launch technology driven opportunities for migrants in villages. Ministry of Panchyat raj has selected different technologies that can be deployed in villages useful for migrants. These technologies will be useful for generation of employment in the villages and their by preventing their return to cities.

But main important criteria has to be taken care is the availability of facilities of cities in the villages. If the same facilities available in city are found in villages, nobody will migrate in the city.

Concept of CILAGE (City + Village) has been launched by Padmbhushan Dr Anil Kakodakar which emphasizes the development of technology based village which will have facilities like city. One such village has been identified near Pandharpur named Gopalpur. The concept has been proved successfully implemented and running for last 3-4 years showing path for other villages to follow. Shri Vitthal Engineering Research Institute (SVERI) is the nodal institute for this activity.

Photo: Mass movement by the people rural India. Image curtsey https://www.indiatoday.in

The Rural Human and Resource Development Facility (RHRDF) has been developed at this villages which has become a self-sustainable training, demonstration, production and service center for a number of technologies that are of benefit to rural people in these functions based on technologies sourced from BARC for the benefit of local people. RHRDF also is a hub that apart from implementing its own activities, also supports similar activities at a number of villages in the neighborhood.

Maharashtra Knowledge Foundation (MKF) has joined hands with RHRDF/SVERI has added additional much needed strength to self-sustainability of RHRDF through professional support in terms of management, guidance in marketing and branding of products and services etc. More importantly, this arrangement could also synergize knowledge enabled development through MKF and technology enabled development through RHRDF leading to emergence of a more comprehensive development model.

This model has potential for technology led development of villages. Rural-urban migration can be limited if better income-earning opportunities are created in rural areas. Two avenues can make it happen: Increase in returns from small-farm agriculture; and more employment opportunities in the rural non-farm sector. Technology based support will defiantly help the villages to go ahead in this direction.

Role of BARC in Rural Development:

BARC is one of the premier institute of India engaged in multidisciplinary research activities in different areas of science and technology. BARC has developed several technologies suitable for rural India. These technologies have lot of potential for deployment in villages and making farmers self-reliant.

These technologies are explained below…..

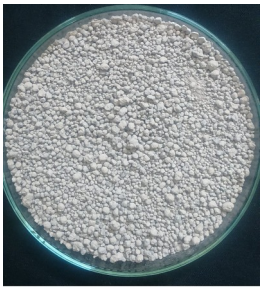
NISARGRUNA biogas plant: The technology has been developed at BARC for decentralized processing of the biodegradable waste that would help in reducing the transportation cost and health menace associated with it. It is expected that Nisargruna units of 1 to 2 metric tons per day capacities would be ideal for rural areas for handling agro-waste. Concept of community kitchen useful for group of households in the village can be worked out using this technology. The project is expected to generate employment in the low income sector of the society. It would help the ever-depleting energy sector by generating fuel for domestic cooking. The technology has evolved in last several years and more than 250 such NISARGRUNA plants are operational in various states of India.

Soil organic carbon detection kit: Organic carbon is an indicator element of soil fertility. Positive correlation between carbon content and crop yield has been observed all over world within different types of soil. A simple technology for instant analysis of fertility of soil has been developed at BARC.

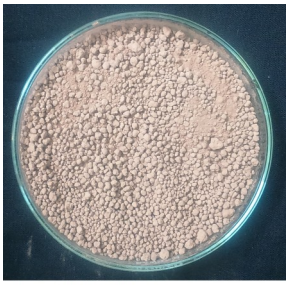
As this is quick method and all the farmers can perform it on the field, then farmer doesn't have to rely on other agencies for the results. Organic carbon detection kit has become an important tool in organic agriculture which is going to be agriculture of coming years. Farmers have become more aware about ill effects of chemical day by day and consumers are also demanding organic foods. This kit is an excellent tool to test the organic nature of soil.

Microfine Neem biopesticide: This biopesticide has been developed using a novel technique of making micro-sized powder of whole Neem fruits. Azadirachtin, the active ingredient in Neem, after extraction becomes unstable when sprayed on crops and its insecticidal effect is short-lived. Instead of extraction, this technology utilizes azadirachtin in its original form as in Neem fruit. The product is developed as powder formulation. As the particle size is decreased, the efficacy increases substantially. Thus, the insecticidal effect is stronger and long lasting.

Improved phosphorus (P) and zinc (Zn) fertilizer formulation from biosludge: Phosphatic and zinc fertilizer from biosludge obtained from distillery waste has developed and the process is patented. This fertilizer contains more available phosphorus and zinc is more efficient than conventional fertilizers.



PHOSPHORUS FERTILIZER
(17-18 % P_2O_5)



ZINC FERTILIZER (4-5% Zn)

Photo: Different technologies developed by BARC are very useful for rural entrepreneurship

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Students Corner…

SCIENCE IS FASCINATING…..

Science is an interesting subject, which has grown over years and studied over ages. It is through this subject, we all know about things around us.

I like science a lot. It is one of my favourite subjects. We use science every day. The best thing in science is experiments. I like to try different types of experiments. For instance, to try simple ones like measuring the time for salt to dissolve in various temperatures of water. It is so exciting to find out by yourself in the experiment, that salt dissolves faster in higher temperatures. This way, there are many more experiments that can be done at your home itself, without going to any laboratory.

In science we learn interesting facts. For example, how many bones does a human body have or how many muscles does it take to smile. By knowing all these facts, we can use them for various purposes. This way science helps in letting us do many tasks in engineering, medical field, construction etc.

In science there are three major branches - Biology, Chemistry and Physics. I mostly enjoy Biology as we learn in it about the human body as well as animal and plant life. It is so interesting to know how human body works, how a leaf prepares its own food and how animal survives in different habitat. I was so excited to learn the process of pollination in plants. It was so fascinating to study about how such small particles like pollens travel in the air and gets transferred to another flower to pollinate. This gives rise to formation of new seeds, which in turn creates new plants. And plants are life to our mother earth.

Chemistry and Physics are interesting too. Our world is made up of atoms, molecules and ions. In Chemistry we learn about them. We also learn how these different molecules combine to give rise to new matter. The table salt which we eat is actually known as sodium chloride in Chemistry. When I came to know about it for the first time, I was surprised that we eat this chemical in our food. Physics on the other hand helps us to understand the world around us and satisfies our curiosity. Physics develops our critical thinking and problem-solving skills. Physics tells us about so many laws, which lets the things around us exist the way they are.

Sometimes when I am bored, I take my science book and start reading it. When I read a science book, I feel nice. I even try to imagine whatever I am reading. However, there are some things which I do not like in science. For example, there are too many formulae which are hard to learn. In Physics there is some mathematics too which confuses me sometimes. Thus science is indeed very important subject for all of us. Children should take active interest in this subject. This way, they will be able to learn so many things that happen around us.

Akanksha Khan

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MY EXPERIENCE OF MAKING OWN COPENHAGEN SOLAR COOKER

Sunlight is a renewable energy source that is growing importance. Half of the world's population is still dependent on fuels generated from wood, oil, gas or bio-fuel for cooking. Every year, around 160 lakh hectares of forests are destroyed to obtain wood. This not only harms the environment but is also a root cause for various severe health issues for those continuously exposed to its fumes. In India, one can cook using solar energy for 70-80% of the days in a year. The solar cooker can be used both in the rural and urban area. It saves village women from having to walk for miles in search of firewood and spending their time in smoke-filled kitchens. In urban areas it saves energy on kerosene and LPG.

There are three types of solar cooker available i.e. Box cooker, parabolic cooker & Panel cooker. A box cooker is an insulated box with transparent glass and mirror reflectors. A panel cooker has reflective panels that focus sunlight onto the pot. A parabolic cooker has a parabolic reflector that concentrates heat to the bottom of the pot.

In India, there are two types of solar cookers widely available - box type and parabolic. A box type cooker costs between Rs 2000-2500 with government subsidies, while parabolic cooker cost between Rs 7000-11000. Most families in rural and tribal areas cannot afford such cookers. Hence it is important for them to be cheap and easy to use. The Copenhagen solar cooker is one such alternative.

Copenhagen Solar Cooker: A Copenhagen solar cooker is panel solar cooker and was invented by Sharon Clausson in 2009. It is very easy to make and carry around. It can be made with cheap materials available at home within an hour. The maximum expenditure about Rs. 100 and the model has a lifespan of 1.5 years. It can cook food for 3 people in around 2-3 hours.

Working of Copenhagen solar cooker

The Copenhagen solar cooker works on the following principles:

- Concentrating Sunlight: A mirrored surface is used to concentrate light from the sun into a small cooking area. The panels of the solar cooker concentrate sunlight onto the black bowls. The panels need to be adjusted from time to time depending on the position of the sun so that they can catch the sun's rays.
- Converting light energy to heat energy: The heat from sunlight is transferred to the food kept inside the vessel by conduction. The vessels used in solar cookers are black in colour to maximize the absorption.
- Creating greenhouse effect or trapping heat energy: Along with the vessel and food, the air surrounding the vessel also gets heated due to convection. The transparent glass pot allows sunlight to reach the vessel but does not allow the heat to leave as glass is a bad conductor of heat. This is called a greenhouse effect and improves heat retention and minimizes convection loss. A plastic bag can also be used instead of the glass bowl.

Making your own Copenhagen solar cooker

Making a solar cooker requires cardboard, aluminium foil, scissors, ribbons (144 cm), a steel mesh, two black bowls, clothes pins, and one glass bowl.

I used the objects that were available at home, thus, the size of my solar cooker was based on the size of the items available. Thus if the items are of different sizes, then the size of the solar cooker changes too. First, you need to cut the cardboard into four equal squares (35cm × 35cm) and cover the aluminium foil. These are our panels. Then cut a square-shaped cardboard base (22cm × 22cm) smaller than the panels about the diameter of the glass bowl and cover it with aluminium foil (Fig 1). Then, make two holes in one corner of each panel and make holes in the base. Then insert the ribbon into one holes of the panel, pass it through two holes of the base, and then insert it into the panel before repeating.

Once assembled, place the mesh on the base of the foil, place one black bowl facing upwards on the mesh. Then add whatever you want to cook in the bowl, before placing the other bowl facing downwards on the first bowl. Finally place the glass bowl over all of it, facing downwards. Now using the clothes pins, adjust the panels so that the sunlight falls on them and are reflected to fall on the bowl. On a normal summer day, it should take about an hour and half to cook two servings of rice.

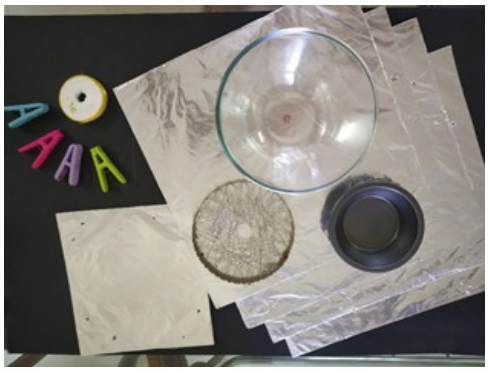
Advantages

This cooker is great help as an emergency cooker: During disasters such as floods, earthquakes hiking, power outage, etc, as long as there is sunlight, you can use it to cook food. It cleans easily and as the food cooks slowly, less nutritional value is lost. Because it is lightweight and folds flat you can take it camping, backpacking, to the beach or just use it at home. You don't have to spend a lot of money or carry around a heavy cooker around to enjoy solar cooked food.

Copenhagen solar cookers are being promoted by NGOs as cost effective, non-polluting alternative to wood burning chulas in villages. Gujarat Grassroots Innovation Augmentation Network has promoted the use of Copenhagen cookers in more than 100 villages in Gujarat. Similar work is also being done in Maharashtra, MP and Karnataka.

Conclusion

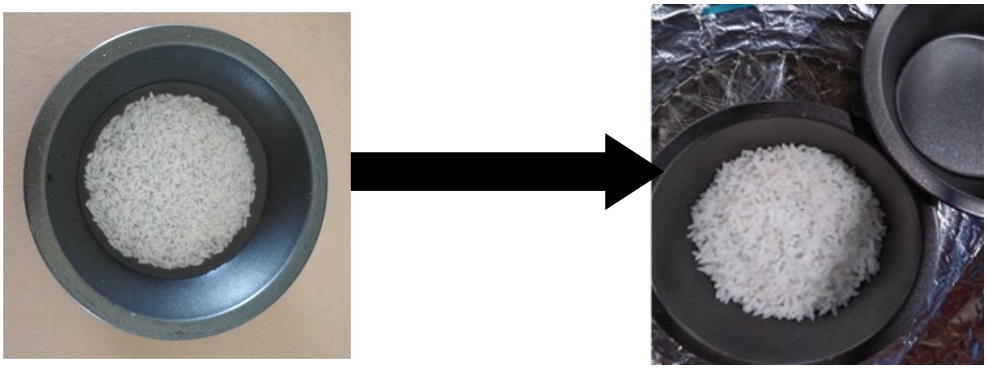
There are, no doubt, challenges associated with using solar energy for cooking under all conditions. But we need to focus more on renewable energy in the near future, as we all need to do our part to control pollution and reduce energy loss. Using solar cooker might be a time-consuming option, but it's a healthy one. The solar cooker is a lifetime asset. With improvements in technology and the support from the government, it could become a viable alternative to traditional cooking methods in certain cases and reduce our carbon footprint.



Materials for making cooker

Joining the panels to the base

Fully assemble Solar Cooker



Fully Cooked Rice

Ms Devika Bhujbal,
Class VII,
Podar International School,
CBSE - Nerul

Picture gallery.....

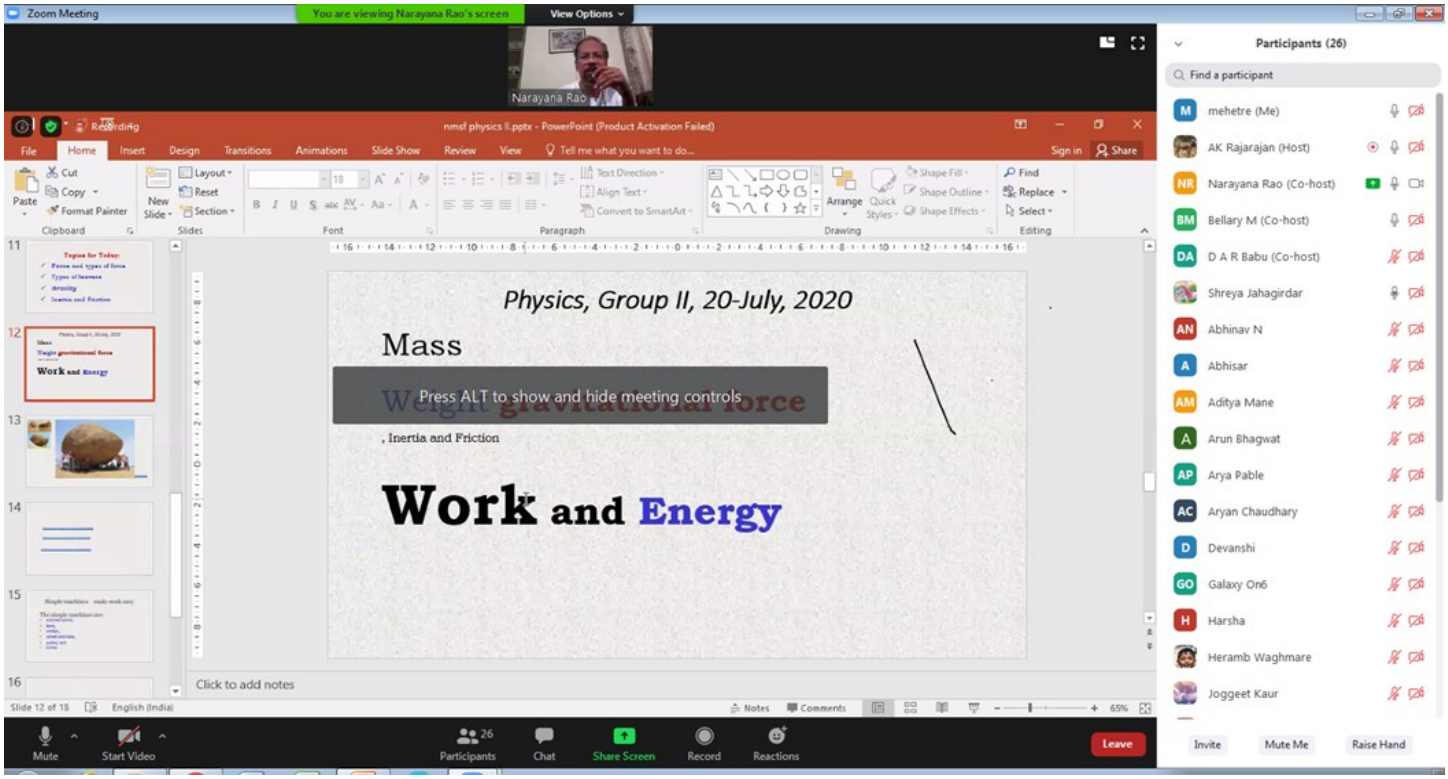


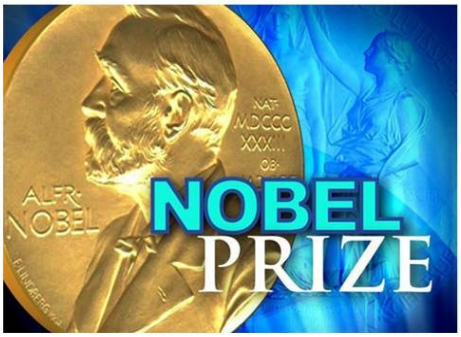
Photo: NMSF Homi Bhabha Bal Vaigyananik Competition online classes under progress through Zoom platform

DON'T MISS IT.....

COMING UP IN NEXT ISSUE No 4

(January to March 2021)

1. NOBLE WINNERS 2020
2. JOURNEY THROUGH VACCINE DEVELOPMENT
3. WORLD NUCLEAR ENERGY DAY! 2ND DECEMBER
4. STUDENT'S CORNER
5. TEACHER'S PAGE
6. FROM MY BOOK SHELF....SCIENCE AND EDUCATION BASED BOOKS



DO YOU HAVE A INTERESTING EDUCATIONAL STORY???
SHARE WITH US!!!!

NMSF EVENTS CALENDAR 2020

January

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Science Utsav

February

Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

National Science Day

March

Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Pre-RMO

Fun with Science from 15 Feb to 15 March

April

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May

Su	M	Tu	W	Th	F	Sa
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3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June

Su	M	Tu	W	Th	F	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

HBBVC Classes April to September (except May) every Sunday

July

Su	M	Tu	W	Th	F	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August

Su	M	Tu	W	Th	F	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

September

Su	M	Tu	W	Th	F	Sa
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
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27	28	29	30			

RMO & Science Club every Sunday

Nobel Laureatism writing

October

Su	M	Tu	W	Th	F	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

November

Su	M	Tu	W	Th	F	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

December

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Nobel Laureatism oral

HBBVC practicals full day

World Nuclear Energy Day

Teachers in Jharkhand's Dumka Turn Village into Classroom.....

Kudos to all the teachers who have taken that extra mile to provide the best possible solution at this most pressing situation....