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VIPNET NEWS

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INTERNATIONAL
YEAR OF LIGHT

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A Monthly Newsletter of Vigyan Prasar Network of Science Clubs - VIPNET

EDITORIAL

Dear VIPNETIANS,

Namaskar. Most of you are witness to the consistent interaction and appeal for the re-registration of our affiliated clubs. I am happy to mention that we have received huge response to our appeal to re-register the clubs. I am equally excited to share with you our recent endeavour to reach out to maximum clubs. Recently, Vigyan Prasar conducted five multidisciplinary workshops on Science and Technology in five zones of the country. The workshops were organized at Itanagar (09 to 11 February), Pachmari (21 to 23 February), Palakkad (27, 28 February and 01 March), Jodhpur (16 to 18 March) and Ranchi (24 to 26 March) for the active clubs from North Eastern Zone (Assam, Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Tripura and Sikkim), Central Zone (Chhattisgarh, Madhya Pradesh, Maharashtra, Gujarat, Goa, Dadra & Nagar Haveli, Daman and Diu), Southern Zone (Andaman Nicobar Islands, Andhra Pradesh, Karnataka, Kerala, Lakshadweep, Tamilnadu, Puducherry, Telangana), Northern Zone (Delhi, Haryana, Himachal Pradesh, Punjab, Rajasthan, Jammu & Kashmir, Uttarkhand, Chandigarh) and Eastern Zone (Bihar, Jharkhand, Odisha, Uttar Pradesh, West Bengal) respectively. Through these workshops we reached out to 250 clubs (50 at each venue) encompassing around 180 districts of India. One significant step taken during these workshops was appointing coordinators for various zones and to engage them in validating the listed science clubs in their vicinity. Within next six months, we are hopeful to receive a list of active and inactive clubs from the respective coordinators. With the support system generated during these five workshops, we can confidently state that we managed to reach about 200-220 districts of the country. Kudos to the VIPNET team!

The time for active and vibrant participation is on, in this issue we have brought three articles viz. Sunlight-light of life, Corrosion under the column of exploring science and Coral Reef-forests of the ocean. As promised in the last issue, a special article on History of Light and International Year of Light-2015 to celebrate the IYL-2015 is a part of the newsletter. For the wider reach and readability of the special article, it has been brought out in Hindi as well as in English. We have included a column 'CLUB SPEAK' keeping in view the efforts you are putting up in report submission. Selected and most promising reports have been published in the current issue. You are requested to make use of this platform to showcase your talent and display your activities on a wider canvas. Finally, puzzles, quizzes, activities, question-answers are included to grab the gifts for your clubs.

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» International Year of Light-2015

» Sunlight: The Light of Life

» Exploring Science - Corrosion

» Coral Reefs- The forest of Oceans

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» Club Speak



The roots of education are bitter, but the fruit is sweet.

Aristotle

संपादकीय

प्रिय विपनेट सदस्यों,

नमस्कार। आप में से अधिकांश हमारे संबद्ध क्लबों को पुनः पंजीकरण कराने की लगातार कोशिशों और आग्रह के गवाह हैं। मैं इस बात से खुश हूँ कि हमारे क्लबों को पुनः पंजीकृत कराने के आग्रह को भारी प्रतिक्रिया मिली है। मैं अधिक से अधिक क्लबों तक पहुँचने के अपने प्रयास को साझा करने के लिए भी उतना ही उत्साहित हूँ। हाल ही में, विज्ञान प्रसार ने देश के पांच क्षेत्रों में विज्ञान और प्रौद्योगिकी पर पाँच बहु-विषयक कार्यशालाओं का आयोजन किया। कार्यशालाओं का आयोजन ईटानगर (09-11 फरवरी), पचमढी (21-23 फरवरी), पलक्कड़ (27,28 फरवरी और 01 मार्च), जोधपुर (16-18 मार्च) और रांची (24-26 मार्च) में पूर्वोत्तर क्षेत्र (असम, अरुणाचल प्रदेश, मणिपुर, मेघालय, मिजोरम, नागालैंड, त्रिपुरा और सिक्किम), मध्य क्षेत्र (छत्तीसगढ़, मध्यप्रदेश, महाराष्ट्र, गुजरात, गोवा, दादर और नागर हवेली, दमन और दीव), दक्षिणी क्षेत्र (अंडमान निकोबार द्वीप, आंध्र प्रदेश, कर्नाटक, केरला, लक्ष्याद्वीप, तमिलनाडू, पोण्डिचेरी, तेलंगाना), उत्तरी क्षेत्र (दिल्ली, हरियाणा, हिमाचल प्रदेश, पंजाब, राजस्थान, जम्मू और कश्मीर, उत्तराखंड, चंडीगढ़) और पूर्वी क्षेत्र (बिहार, झारखंड, उड़ीसा, उत्तर प्रदेश, पश्चिम बंगाल) के सक्रिय क्लबों के लिये किया गया। इन कार्यशालाओं के माध्यम से हम भारत के लगभग 180 जिलों के 250 क्लबों (प्रत्येक स्थल पर 50) तक पहुंच पाए। इन कार्यशालाओं के दौरान विभिन्न क्षेत्रों के लिए समन्वयकों की नियुक्ति और उन्हें उनके आसपास के क्षेत्रों में सूचीबद्ध विज्ञान क्लबों को सत्यापित करने के लिए शामिल करना, जैसे महत्वपूर्ण कदम लिए गए। अगले छह महीनों के भीतर, हमें उम्मीद है कि हम संबंधित समन्वयकों से सक्रिय और निष्क्रिय क्लबों की सूची प्राप्त कर लेंगे। इन पांच कार्यशालाओं के दौरान उत्पन्न समर्थन प्रणाली के साथ, हमें विश्वास है कि हम देश के 200-220 जिलों तक पहुंचने में कामयाब रहे हैं। विपनेट टीम को बधाई!

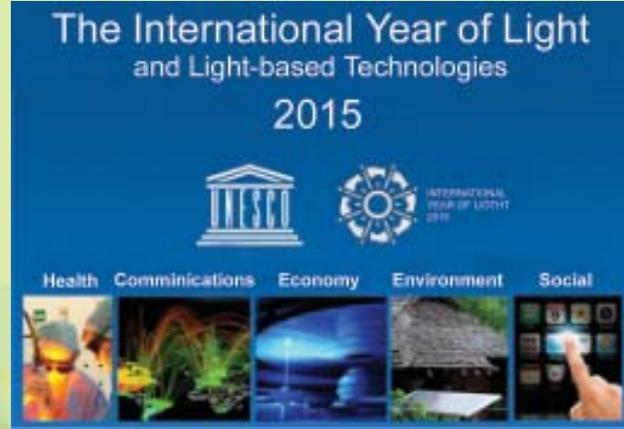
आपकी सक्रिय भागीदारी के लिए, इस अंक में हमने तीन लेखों को शामिल किया है जो कि इस प्रकार हैं जीवन में सूर्य की रोशनी का महत्व, विज्ञान की खोज के पत्रभाग में संक्षारण और सागर के कोरल रीफ जंगल। जैसाकि पिछले अंक में वादा किया था IYL-2015 का जश्न मनाने के लिए रोशनी का इतिहास और रोशनी के अंतर्राष्ट्रीय वर्ष पर एक विशेष लेख समाचार पत्र का हिस्सा है। व्यापक पहुंच और विशेष लेख की पठनीयता के लिए, यह हिन्दी के साथ-साथ अंग्रेजी में भी प्रकाशित किया गया है। आपके रिपोर्ट प्रस्तुत करने के प्रयासों को ध्यान में रखते हुए हमने इसमें एक पत्रभाग 'क्लब स्पीक' को शामिल किया है। चयनित और सबसे उत्तम रिपोर्टों को ताजा अंक में प्रकाशित किया गया है। आप सभी से अनुरोध है कि आप अपनी प्रतिभा और एक व्यापक स्तर पर अपनी गतिविधियों को प्रदर्शित करने के लिए इस मंच का उपयोग करें। अंत में, पहली, प्रश्नोत्तरी, गतिविधियां, सवाल-जवाब इस अंक में आपके उपहार जीतने के लिए शामिल किए गए हैं।

■(अनुवाद: विपिन सिंह रावत)



INTERNATIONAL YEAR OF LIGHT-2015

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No doubt, right from antiquity human's curious mind was on investigative path with the questions like what is light? How it is generated? What is its nature? What is the difference between light coming from sun and the stars at night? One of the most revolutionary finding came in 1665 when Isaac Newton tried to pass the sun's light through prism, splitting the white light into seven colours! Therein it was established that the white light is made up of seven colours. Numerous experiments have been conducted by various scientists with the objective of exploring the nature of light. The detailed review, research, understanding on various aspects will be discussed in the future issues.

It is extremely essential to note that modern science has not only debated the nature of light but revolutionized understanding and use through optical technologies like laser, LIDAR, LED, LCD, fibre optics etc. These technologies have transformed the field of medicine, opened up international communication via the Internet, and continue to be central to linking cultural, economic and political aspects of the global society. Therefore, we can assertively say that light and light based technologies are helping to promote sustainable development and provide solutions to worldwide

challenges in energy, education, agriculture, communications and health.

Perhaps in the context of recognizing the efforts and utility of light, on 20 December 2013, the United Nation's 68th General Assembly Session proclaimed 2015 as the **International Year of Light and Light-based Technologies (IYL 2015)**. It is also to be noted that the year 2015 happens to be 1000th anniversary of Arab scientist Ibn al-Haytham, a pioneering scientific thinker who made important contributions to the understanding of vision, optics and light. Ibn al-Haytham was born around a thousand years ago in present day Iraq. He wrote remarkable seven volume treatise on optics Kitab al-Manazir. His methodology of investigation, in particular using experiment to verify theory, shows certain similarities to what later became known as the modern scientific method.



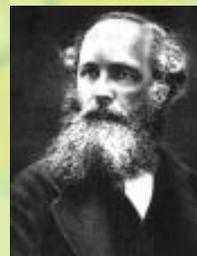
Ibn al-Haytham

In 13th century Alhazen's book entitled 'Kitab al-Manazir' was translated in Latin, and it has been said that the translation greatly influenced a number of western scientists including Roger Bacon- English philosopher, Witelo- Polish natural scientist and philosopher, Leonardo da Vinci- a famous Italian Philosopher, Galileo Galilei, Kepler and others. According to the international society for optics and photonics (SPIE), the major scientific anniversaries to be celebrated during the International Year of Light are:

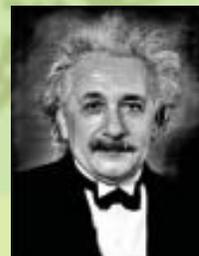
- Ibn al-Haytham's Book on Optics (1015)
- Fresnel Theory of Diffraction (1815)
- Electromagnetic Theory of Light Propagation (Maxwell, 1865).
- Einstein's Theory of Photoelectric Effect (1905)
- Einstein's General Theory of Relativity which predict the bending of light by massive bodies (1915)
- Charles Kao's achievements concerning the transmission of light in fibres for optical communication (1965)



'Kitab al-Manazir'



Maxwell



Einstein



Fresnel

Throughout the year 2015, large number of programs like audio serial, video serial, publications, seminars, conferences and workshops will be arranged focusing on the light and light based technologies by Vigyan Prasara. Important discoveries, innovations and findings related to light will be highlighted in upcoming issues.



SUNGLIGHT THE LIGHT OF LIFE

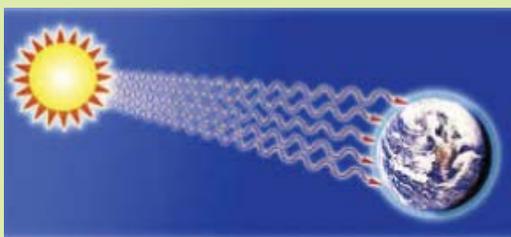
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'Earth' is the only known planet of the universe where life exists! Do you know what makes life possible on this planet? Presence of water, atmosphere, Earth's inclination at a specific angle ($23\frac{1}{2}$ degree) to its axis and the distance from the sun resulting in the right temperature makes life possible. One more thing is important for the life on Earth and that is sun and sunlight. However all planets do receive sunlight but none uses it like the Earth. Green plants and trees make their food (glucose and starch) with the help of sunlight using water and carbon dioxide in presence of chlorophyll. This very significant biological process is called photosynthesis. The glucose and starch produced by plants is consumed by the animals and humans. Apart from photosynthesis, sunlight has a role in other biological processes like transpiration, seed germination, flowering, etc.



Light intensity, reaching the Earth's surface shows wide variation, being influenced by factors such as the atmospheric gases, suspended particles, water vapour, and layers of vegetation. Intensity of sunlight is closely related with atmospheric temperature and relative humidity.

A large part of solar radiation is absorbed by the atmosphere. The intensity of sunlight thus is greater at higher altitudes than at sea level. This is due to thinner layers of air at higher altitudes. On a cloudy day, the intensity of sunlight may be reduced to 4% of the normal. The intensity of sunlight decreases successively with increasing depth under water. Generally at dawn, sunset and in water, the light intensity is weak.



In this article, we shall discuss the role of sunlight in the lives of plants and animals. You will see that sunlight is essential to their existence and biological activities.

Sunlight also plays very crucial role in the bio-diversity and ecological distribution of life forms on our planet apart along with its role in the growth, development and biochemical process (like photosynthesis and transpiration) in plants and animals.

Role of sunlight in plant life

We all are aware photosynthesis is not possible without sunlight, but do you know that is not all. Sunlight affects plants in many more ways.

Distribution of plants and ecological succession

The amount of sunlight received at the poles is different from the amount received at other parts of Earth. Thus total amount of solar radiation received by Earth's surface differs with latitude. This variation leads to varied distribution of vegetation over the planet.

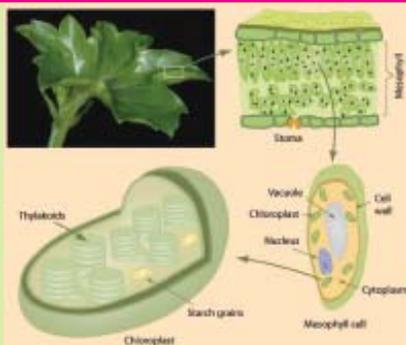
Ecological Succession	Year	
	Crab-grass	0-1
Tall grass-herbs / ceous plants	1-3	
Pines come in	3-10	
Pine forest	10-30	
Hard-woods come in	30-70	
Hard-wood forest climax	70+	

Natural ecological succession

Not just the diverse forms found in different regions but also the increasing complexity is related to sunlight. Botanists indicate the role of sunlight in the ecological succession. *Ecological succession* is the observed process of change in the species structure of an ecological community over time. The community begins with relatively few pioneering plants and animals and develops through increasing complexity until it becomes stable or self-perpetuating as a climax community. Botanists also indicate the role of sunlight in the ecological succession. It is generally mentioned that the light requirements of pioneer plants are comparatively much more than the climax plant species.

Chlorophyll production

Chlorophyll is the green pigment found in plant cells which is responsible for green colour of leaves. Photosynthesis is not possible without this pigment. Most plants need sunlight for chlorophyll formation. Seedlings of conifers young, fronds of ferns, some mosses and algae are a few exceptions which may become green even without sunlight.



Microscopic view of chlorophyll in the plant leaf

Stomatal movement and transpiration

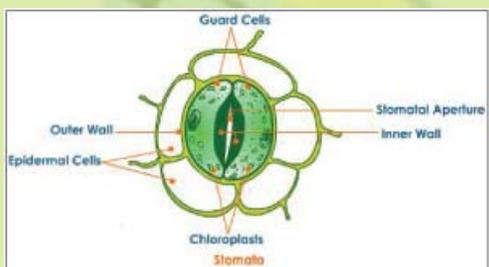
Like animals, plants also breathe, but they do it through tiny openings in the leaves called *stomata* (singular-stoma). The opening and closing of stomata allows exchange of gases. It allows the plant to photosynthesize and respire. During day time, the rate of photosynthesis is more while respiration is less. The overall effect is net release of oxygen which helps to maintain a balance of oxygen on Earth. The opening and closing of stomata is regulated by sunlight. Loss of water vapour from aerial parts of the plants is called transpiration and this process is also affected by sunlight.



Stomata present on the leaf surface



A single stomata



Structure of Stomata

Role of sunlight in animal life

Sunlight has effect on animals also. The biological activities of animals like metabolism, pigmentation, reproduction, growth, development, locomotion, migration etc. are greatly influenced by light. These may be depicted as follows:

Metabolism and reproduction

Sunlight affects metabolic processes of animals through its heating effect on tissues and by ionisation of protoplasm. This results into an increase in enzymatic activities and degree of solubility of salts and minerals.

Cave-dwelling animals live under poor light and thus show slow rates of metabolism.

Growth and development

The growth of animals is greatly affected by light. The normal development of several animals occurs only under sufficient light conditions. The degree of eye development in animals sometimes depends upon the available light intensities. In animals living in caves and deep sea, the eyes are absent or rudimentary. Higher animals including humans are able to see various objects only in the presence of light.

Protection by pigmentation

The process of pigmentation in animals (the development of skin colour) is influenced by sunlight in a number of ways. For example, in some animals living in caves etc., the pigments in skin are lacking due to absence of light. Some animals develop colouration in their skin which more or less mimics the background in which they live. Many butterflies and Australian fishes have colouration exactly like their habitats, which offer a good means of protection from their enemies. This kind of self-defence mechanism in animals is called 'camouflage'. In this phenomenon, light plays important role.



The images of camouflage exhibited by butterfly and chameleon in nature

Thus it is evident that light plays a very significant role in various biological activities in plants as well as in animals. Sunlight helps life to flourish on earth. We are fortunate that we are lie on this planet where sunlight makes it possible life to flourish.

ACTIVITY-1

**Grab a Book
Life on Earth**

1. Cover a leaf of any plant with a transparent polythene bag and tie it so that the leaf is enclosed in the bag. You have to do this activity in day light. Observe the polybag after 4 hours and write down your observation.
2. Which animal/s in your locality exhibit/s camouflage? Enlist the animals. Give their local and zoological names.

Complete the activity and send the result at vipnet@vigyan.prasar.gov.in with subject title 'Activity-1' (Month) OR Send the answer in an envelope entitled VIPNET 'Activity-1' (Month) to Vigyan Prasar, A-50, Institutional Area, Sector-62, Noida-201 309 (U.P.).



EXPLORING SCIENCE: Corrosion

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The parts of machines made of iron need regular oiling. The iron pipes need to be painted frequently. Why do we need to oil and paint these iron articles regularly? What is the reddish brown coating that develops on the iron objects?



Oil rigs use blocks of aluminium at the foot of every supporting pillar or zinc or magnesium blocks on pillars to prevent corrosion of the iron metal. Why are these blocks of reactive metals used? What will happen if we replace the blocks with copper?

The old silver jewellery and cutlery is not as shiny as the new jewellery and cutlery. It develops a blackish coating. What is this black coating on silver?

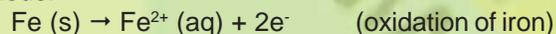


Corrosion is the reason why iron articles develop a reddish brown coating. This coating is called rust. The black coating on silver is also due to corrosion, silver forms silver sulphide when it reacts with hydrogen sulphide present in air. The corrosion of metals is a common phenomenon which leads to eating away of metals.

Corrosion is a process of slow oxidation of metal. The metal on exposure to air and moisture gets oxidised. The process of corrosion is an electrochemical phenomenon. A small electrochemical cell is formed on the surface of metal.

In case of iron the reactions occur as follows:

Anode:



Cathode:

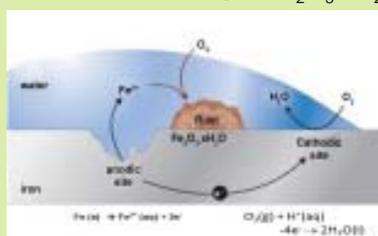


The overall reaction:



The ferrous (Fe^{2+}) ions get oxidised to ferric (Fe^{3+}) ion in presence of atmospheric oxygen and form ferric oxide which in presence of water forms rust or hydrated ferric oxide.

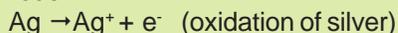
The rust or reddish brown coating is $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$



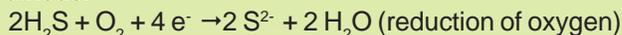
Oxidation is the process of loss of electrons and reduction is the process of gain of electrons. Oxidation and reduction go hand in hand. The reaction is called as redox (reduction-oxidation) reaction.

In case of silver, the process of corrosion is called tarnishing of silver. The silver ornaments react with H_2S in the atmosphere to form silver sulphide. The exposure to high sulphur foods like eggs increases the rate of tarnishing of silver. Silver metal gets oxidised and forms the black silver sulphide as shown in the reaction:

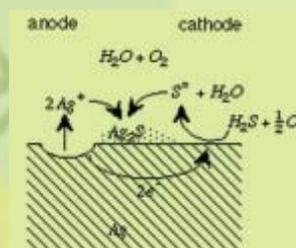
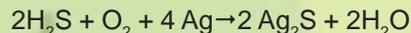
Anode:



Cathode:



Overall reaction:



Like oil rigs, the hulls of large sea vessels use small zinc blocks placed at regular intervals to prevent it from rusting. Periodically these zinc blocks have to be replaced as they corrode away. Aluminium, zinc and magnesium are much more reactive than iron.

The more reactive metal here, Zinc, Aluminium or Magnesium sacrifice themselves to prevent rusting of iron, hence the name *sacrificial anode*.

A sacrificial anode is a block of metal that is more reactive than iron. More reactive the metal, more easily it gives away electrons. This reactive block of metal acts as a source of electrons for the iron. When oxygen takes electrons from the iron during the process of rusting,



iron atoms simply take electrons from the reactive metal.

Background

Corrosion refers to a process of slow oxidation of metal. Air and moisture are required for corrosion to take place. In case we are able to cut off contact with air or moisture, we can prevent corrosion of the metal.

ACTIVITY-2



In this project you'll find out methods to prevent iron from corroding (rusting)

Materials and Equipment

To do this experiment you will need the following materials and equipment:

- 5 Iron nails
- Aluminium foil
- Water
- Copper strip or wire
- Oil
- 5 glasses
- Paint

Experimental Procedure

1. Pour water in the glasses so that half the glass is filled with water.
2. Number the glasses 1,2,3,4 and 5
3. In glass 1, place an iron nail.
4. In glass 2, place an iron nail after coating it with layer of oil / grease.
5. In glass 3, place a well painted iron nail.
6. In glass 4, place an iron nail connected with a wire to aluminium foil.
7. In glass 5, place an iron nail connected with a wire to a copper strip or wire.
8. Allow the nails to remain in this condition for a week.
9. Observe the nails daily and note your observations, (colour of nail greyish or reddish brown, any rust observed) in the table given below.

Observation Table:

Glass Number	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1							
2							
3							
4							
5							

Conclusion and Explanation:

Answer the following questions:

The silver idol your parents purchased years ago was in a sealed box. The silver did not get tarnished, the idol still appears new. Why is it so?



Copper coins turn green after some time. What is this green coating?
Try to write the reactions for the process.



The iron pillar at Qutab Minar was built 1600 years ago and has not rusted. Find out the reason.



Complete the activity and send the result at vipnet@vigyanprasar.gov.in with subject title Activity-2' (Month)
OR send the answer in an envelop entitled VIPNET 'Activity-2' (Month) to Vigyan Prasar, A-50, Institutional Area, Sector-62, Noida-201 309 (U.P.).



CORAL REEFS : THE FORESTS OF OCEANS

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Introduction

Coral reefs are the most beautiful and diverse of all marine ecosystems. Coral reefs teem with life, perhaps one quarter of all ocean species



depend on reef for food and shelter thus acting as a foundation of oceanic ecosystem. Coral reefs are very important to people, the value of coral reef has been estimated at 30 billion U.S dollar and perhaps as much as 172 billion U.S dollar each year, providing food, protection of shorelines, job based tourism, and even medicines.

Major areas where corals are found

- The Great Barrier Reef is the largest in the world, off the coast of Australia
- The Great Mayan Reef—second largest in central America
- The Andros, Bahamas Barrier Reef—third largest in Bahamas

In India, coral reefs are found in

- Gulf of Kutch
- Lakshadweep
- Gulf of Mannar
- Andaman and Nicobar Islands

Corals themselves are tiny animals which belong to the group Cnidaria (the “c” is silent). Other cnidarians include hydras, jellyfish and sea anemones. Corals are sessile animals, meaning they are not mobile but stay fixed in one place. They feed by reaching out with tentacles to catch prey such as small fish and planktonic animals. Corals live in colonies consisting of many individuals, each of which is called polyp. They secrete a hard calcium carbonate skeleton, which serves as a uniform base or substrate for the colony. The skeleton also provides protection, as the polyps can contract into the structure if

predators approach. It is these hard skeletal structures that build up coral reefs over time.

Different species of coral build structures of various sizes and shapes (“brain corals,” “fan corals,” etc.), creating amazing diversity and complexity in the coral reef ecosystem. Various coral species tend to be segregated into characteristic zones on a reef, separated out by competition with other species and by environmental conditions.

All reef-dwelling corals have a symbiotic (mutually beneficial) relationship with algae called zooxanthellae. The plant-like algae live inside the coral polyps and perform photosynthesis, producing food which is shared with the coral. In exchange the coral provides the algae with protection and access to light, which is necessary for photosynthesis. The zooxanthellae also lend their colour to their coral symbionts.



Despite their immense importance coral reefs are facing severe threats due to global warming and other natural as well as other reasons attributable to mankind. Coral reefs take millions of year to form but they are declining at an alarming rate and coral bleaching is one of the main reasons for their deterioration. Coral bleaching refers to expulsion of symbiotic organism (zooxanthellae) from which they derive food and die as a result. Corals are sensitive to temperature, when they are exposed to higher

temperatures, the corals bleach resulting in the disturbed marine ecosystem. The major cause of bleaching is increase in temperature due to global warming together with natural causes like El Nino. Corals are extremely sensitive to sea water temperatures. Just 1 degree rise in temperature for one week can cause tremendous damage to reefs. As per the studies conducted at U.S National oceanic and atmospheric administration's extreme sea temperatures as seen in 2014, can cause massive destruction of corals, possibly under way in North Pacific Ocean. In 1998, a similar massive die-off was by combined effect of El Nino and Global warming, killing about 15% of world's corals.



According to the researches from National Institute of Oceanography (NIO), Goa, marine waste could also be a cause of coral bleaching. The marine waste includes plastic, medical waste, lost fishing nets, various waste from ships and oil rigs etc. Various fertilizers, waste feed and bio waste speed up the coral bleaching due to the process of **eutrophication**.

The only way out to save the vital backbone of marine habitat is by reining in our carbon footprint globally as different types of environmental pollution plays an important role in speeding up the process of coral bleaching.

How we can contribute in the protection of coral reefs:

- Conserve energy at home, school and other public and private places.
- Use public transport, bicycles, car pooling methods etc. to minimize burning of fossil fuels.
- Avoid using pesticides, harmful chemicals in farming
- Reduce, Recycle, Reuse.

Stand up for nature.....save coral reefs.....protect homes of millions of species in marine ecosystem.

Grab a Book
Mountains Under Siege

ACTIVITY-3

Across

4. Largest Coral Reef
6. Mutually beneficial
7. Species of Corals

Down

1. Process of producing food by plants
2. Symbiotic relation with corals
3. Gradual increase in plant nutrients in aquatic ecosystem.
5. Tiny animal group.

Complete the activity and send the result at vipnet@vigyan.prasar.gov.in with subject title 'Activity-3' (Month) OR Send the answer in an envelope entitled VIPNET 'Activity-3' (Month) to Vigyan Prasar,A-50, Institutional Area, Sector-62, Noida-201 309 (U.P.).

Answer - Activity-2
(October -November-2014)

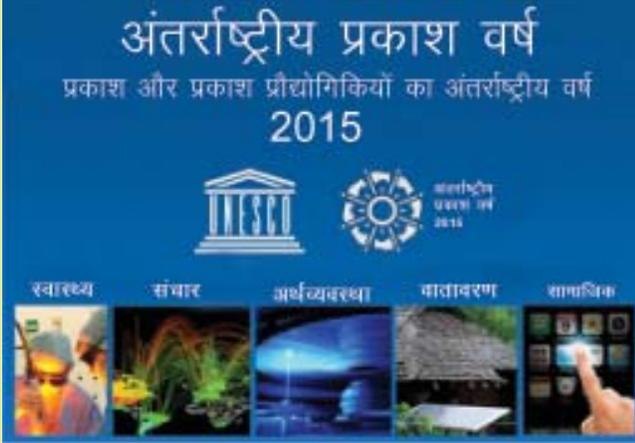
विजेता/Winner

1. Poonam Garg (Uttar Pradesh)
2. Om Prakah, (Haryana)



वर्ष 2015

Dr. Arvind C Ranade
rac@vigyanprasar.gov.in



प्राचीन काल से ही मानव का जिज्ञासु मन कई सवालोंने से घिरा है जैसे कि प्रकाश क्या है? यह कैसे उत्पन्न होता है? इसकी प्रकृति क्या है? सूर्य और रात में सितारों से आने वाले प्रकाश के बीच क्या अंतर है? सन 1665 में एक सबसे क्रांतिकारी खोज सामने आई जब आइज़ैक न्यूटन ने सूरज की रोशनी को समपार्श्व से पारित करने का प्रयास किया जिसके फलस्वरूप सफेद रोशनी सात रंगों में विभाजित हुई! उसी समय यह बात प्रमाणित हो गई की सफेद रोशनी सात रंगों से मिलकर बनी है। प्रकाश की प्रकृति की खोज करने के उद्देश्य से विभिन्न वैज्ञानिकों ने कई प्रयोग किए। विस्तृत समीक्षा, अनुसंधान के विभिन्न पहलुओं पर ज्ञान भविष्य के अंकों में चर्चा किया जाएगा। इस बात को संज्ञान में लेना अत्यंत आवश्यक है कि आधुनिक विज्ञान ने न केवल प्रकाश की प्रकृति पर विचार किया बल्कि इसकी समझ और प्रकाश संबंधी प्रौद्योगिकियों के इस्तेमाल ने चिकित्सा के क्षेत्र, इंटरनेट के माध्यम से अंतर्राष्ट्रीय संचार और वैश्विक समाज के सांस्कृतिक, आर्थिक और राजनीतिक पहलुओं को जोड़ने के लिए केंद्रीय होने को पूरी तरह से बदल दिया।

इसलिए हम दावे के साथ कह सकते हैं कि प्रकाश आधारित प्रौद्योगिकियों ने सतत विकास को बढ़ावा देने और ऊर्जा, शिक्षा, कृषि संचार और स्वास्थ्य में दुनिया भर की चुनौतियों के लिए समाधान प्रदान करने में मदद की।

शायद प्रकाश की उपयोगिता और प्रयासों को मान्यता देने के संदर्भ में ही 20 दिसंबर 2013 को संयुक्त राष्ट्र की 68 महासभा में वर्ष 2015 को प्रकाश और प्रकाश आधारित प्रौद्योगिकियों का अंतर्राष्ट्रीय वर्ष घोषित किया गया। एक और बात ध्यान देने योग्य है कि वर्ष 2015 अरब वैज्ञानिक इब्न अल-हैदम की 1000 वीं वर्षगांठ है। वह एक अग्रणी वैज्ञानिक विचारक थे। जिन्होंने दृष्टि प्रकाशिकी और प्रकाश की समझ के लिए महत्वपूर्ण योगदान दिया। इब्न-अल-हैदम का जन्म करीब 1000 वर्ष पूर्व वर्तमान के इराक में हुआ था। उन्होंने प्रकाशिकी



इब्न अल-हैदम

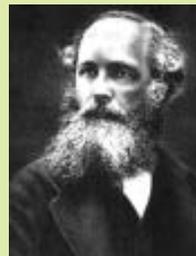
पर 'किताब अल-मानज़ी' नामक सात उल्लेखनीय खंडों में ग्रंथ लिखे थे। उनकी जाँच की कार्यप्रणाली, विशेष रूप से सिद्धांत सत्यापित करने के लिए प्रयोग का उपयोग, आधुनिक वैज्ञानिक पद्धति से काफी मेल खाती है।



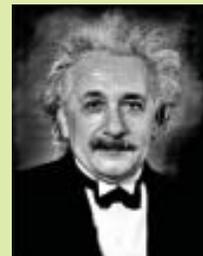
किताब अल-मानज़ीर

13वीं सदी में अल-हैदम की पुस्तक 'किताब अल-मानज़ीर' का लैटिन भाषा में अनुवाद किया गया और उस समय यह कहा गया कि इस अनुवाद ने बहुत से पश्चिमी वैज्ञानिकों को प्रभावित किया जिसमें रेजर बेकोन-अंग्रेजी दार्शनिक, विटीलो-पोलिश प्राकृतिक वैज्ञानिक एवं दार्शनिक, लियोनार्डो दा विंसी- प्रसिद्ध इतालवी दार्शनिक, गैलीलियो गैलीली, केपलर और अन्य शामिल थे। प्रकाशिकी और फोटोनिक्स की अंतर्राष्ट्रीय संस्था (SPIE) के अनुसार प्रकाश के अंतर्राष्ट्रीय वर्ष के दौरान प्रमुख वैज्ञानिकों की वर्षगांठ मनाई जाएगी, जो कि इस प्रकार है:-

- प्रकाशिकी पर इब्न अल-हैदम की पुस्तक (1015)
- विवर्तन पर फ्रेसनेल के सिद्धांत (1815)
- प्रकाश प्रचार पर विद्युत चुम्बकीय सिद्धांत (मैक्सवेल, 1865)
- फोटोइलेक्ट्रिक प्रभाव पर आइंस्टीन के सिद्धांत (1905)
- आइंस्टीन के सापेक्षता पर सामान्य सिद्धांत जो कि भारी निकायो द्वारा प्रकाश के झुकने का अनुमान लगाती है। (1915)
- ऑप्टिकल संचार के लिए फाईबर में प्रकाश क संचरण के विषय में चार्ल्स कार्ओं की उपलब्धियां (1965)



मैक्सवेल



आइंस्टीन



फ्रेसनेल

वर्ष 2015 के दौरान विज्ञान प्रसार द्वारा बड़ी मात्रा में श्रव्यक धारावाहिक, वीडियो धारावाहिक, प्रकाशन, संगोष्ठियों, सम्मेलनों और कार्यशालाओं का आयोजन किया जाएगा। महत्वपूर्ण खोजों, नवाचारों और निष्कर्षों को आगामी अंकों में चिन्हांकित किया जाएगा।



ANNUAL REPORT 2014-15

Eco Club Chaitanya (V0901128), Delhi conducted several activities during the period 2014-2015. Students of the club participated in various programs like talk shows, film screenings, science quizzes, rangoli making, tree plantation, poster making, cleanliness awareness rallies etc on different occasions during this period.



ANNUAL REPORT 2014-15

Ankur Hobby Science Centre (V1101001), Ahmedabad has undertaken several activities during January to December 2014 which includes night sky watching programs, science campaigns, fun with science programs etc. They have also conducted a unique exhibition on 'Mars Orbiter Mission' where different models & posters were exhibited.



ANNUAL REPORT 2014-15

During the past year 2014 Aryabhat Science Club (V1507004), Karnataka incorporated many programs. From demonstration of physics experiments to essay writing competitions they have done many activities for their club members. Club also arranged a visit for their students to science bus exhibition in 2014.

ANNUAL REPORT 2014-15

N.Mallapa Eco Club (V1525004), Karnataka arranged many programs for their students on different occasions like World's Health Day, World's Environment Day, Engineer's day, World's Cancer Day etc during past year. They have also arranged many visits, lectures, rallies, surveys in nearby villages on these occasions.



ANNUAL REPORT 2014-15

C.V Raman Science Club (V3407013), Jharkhand celebrated World's Earth Day & World's Ozone Day with high enthusiasm and joy. Club also conducted many seminars, discussions for teachers & students and many hands on activities for their students like making of solar cooker, barometer, motor etc during the calendar year 2014.

ANNUAL REPORT 2014-15

Sir C.V. Raman Science Club (V1525005), Karnataka conducted many plantation programs, visits of students to nearby locations, science exhibitions during the period 2014-2015.

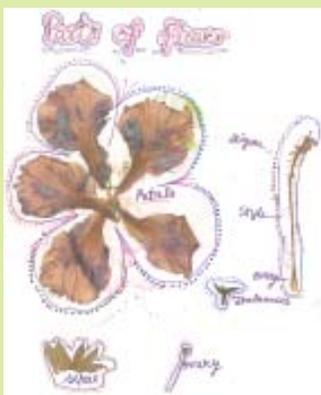


ANNUAL REPORT 2014-15

In the year 2014 VIPNET Club of Aadharshila Public School, Bijnor conducted many science activities in their school for students. The list of activities done by the club during the year includes information on animal cell & parts of flower, fluid mosaic model, protein & burette test, story writing competition (related to physics), discussions on



topics like reforestation & deforestation and many more activities are done by the club.



okf"kd fji kVZ 2014 &15

डॉ. सी.वी. रमन साइंस क्लब (V3311004), कवर्धा द्वारा अगस्त 2014 से फरवरी 2015 के बीच की कई गतिविधियों का आयोजन किया गया। इसमें मुख्य रूप से विज्ञान क्लब द्वारा वृक्षारोपण कार्यक्रम, विज्ञान प्रदर्शनी, स्वच्छता अभियान, अंतर-शालेय विज्ञान प्रतियोगिता मुख्य रहें। गत् 14 फरवरी 2015 को क्लब द्वारा एक शैक्षणिक भ्रमण का आयोजन भी किया गया जिसका मुख्य उद्देश्य बच्चों को वन्य जीव एवं पेड़ पौधों की जानकारी देना था।

okf"kd fji kVZ 2014 &15

यूनीवर्सल साइंस क्लब (V3176002), उत्तर प्रदेश द्वारा गत वर्ष 2014-2015 में पन्द्रह विभिन्न गतिविधियों का आयोजन किया गया। पर्यावरण दिवस के अवसर पर क्लब द्वारा एक कार्यक्रम का आयोजन किया गया जिसमें बच्चों को पर्यावरण के बचाव के बारे में जानकारी दी गई। इसके अलावा समस-समय पर क्लब द्वारा विभिन्न प्रकार के आयोजन किए गए जैसे गणित दिवस पर जागरूकता गोष्ठी, विज्ञान मेले का आयोजन, अंधविश्वासों के खिलाफ जागरूकता अभियान इत्यादि।

okf"kd fji kVZ 2014 &15

स्वामी विवेकानन्द साइंस क्लब (V3138049), उत्तर प्रदेश द्वारा बीते वर्ष विभिन्न कार्यशालाओं का आयोजन किया गया जिसमें पर्यावरण सप्ताह, पौधा रोपण प्रदेश स्तरीय विद्यार्थी विज्ञान मंथन, सी.वी. रमन तथा रामानुजय जंयती पर विद्यार्थियों के लिए विशेष गतिविधियों का आयोजन मुख्य रहे।

gkFk /kq/kbZ fnoI

गत् 15 अक्टूबर 2014 को डॉ. ए.पी.जे. अब्दुल कलाम क्लब, छत्तीसगढ़ द्वारा हाथ धुलाई दिवस का आयोजन किया गया। इस दौरान बच्चों को बिना साबुन लगाए तथा साबुन लगाकर हाथ धोने पर पानी की स्थिति, पांच चरणों में हाथ धुलाई का अभ्यास तथा स्वच्छता एवम स्वास्थ्य के लिए हाथ धोने की विशेषता का वर्णन किया गया।



ANNUAL REPORT 2014-15

Pathani Samanta Science Club (VPOD0001), Odisha had done many programs during 2014-2015. During this period club celebrated National Science Day, World's Environment Day, Energy Conservation Day etc. Club also arranged seminars, quizzes, hands on activities etc for their students on regular basis during this period.

ANNUAL REPORT 2014-15

In the year 2014 The Vision Science Club (V2407127), Cuttack conducted many essay competitions, drawing competitions, debate competitions, seminars etc for their students on occasions like Ozone Day, National Energy Conservation Day, Worlds Aids Day etc.