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INTERNATIONAL YEAR OF PLANT HEALTH 2020



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This is a quarterly e-magazine published by Navi Mumbai Science Foundation, a society engaged in spreading science education among students of Navi Mumbai region for last one decade. The magazine will cover all the activities of the society as well as articles on educating science to the students and teachers.



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Image courtesy: www.fao.org,
<https://www.developmentaid.org/>

Editors Page.....

World was celebrating new year 2020 with joy and zeal but at the same time very dangerous threat to mankind was emerging from the northern city of Wuhan in Hubei Province of China. This threat is known as Corona virus which is spreading all over the world day by day. WHO has declared this outbreak as a global health emergency and declared as world's deadliest status now.

Some people are claiming that China was developing mutant strain of virus as a biological weapon and it has spread to the public. Though this is not confirmed and supported yet, but use of science for such type of things is not at all a good sign in today's world. Science has changed the face of the mankind with great advancements being made in every field. But we all know that everything has both pros and cons.

Coronaviruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV). These are zoonotic, meaning they are transmitted between animals and humans. But this is not confirmed yet. Common signs of infection include respiratory symptoms, fever, cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome, kidney failure and even death.

Standard recommendations to prevent infection spread include regular hand washing, covering mouth and nose when coughing and sneezing, thoroughly cooking meat and eggs. Avoid close contact with anyone showing symptoms of respiratory illness such as coughing and sneezing. There is no reported medicine or vaccine for this deadliest disease so far. So we have to be very careful and keep in the mind that prevention is the best option as of now. Only thing in our hand is to care ourselves and making people aware about its prevention. Let us hope that world will find way to combat this new threat to the mankind and making everybody happy.

Wishing all the readers very happy reading. Stay Safe....

Editor....

INTERNATIONAL YEAR OF PLANT HEALTH 2020

The United Nations General Assembly declared 2020 as the International Year of Plant Health (IYPH). The year is a once in a lifetime opportunity to raise global awareness on how protecting plant health can help end hunger, reduce poverty, protect the environment, and boost economic development.

On this occasion, António Guterres, Secretary-General of the United Nations, mentioned that Plants are essential to all life on Earth, including humanity. They provide us with most of our food and the oxygen we breathe. For nearly half the global population, plants are a primary source of income, and we all rely on them for clothes, medicines, and shelter among other things. By preserving plant health, we contribute to food security, environmental protection, economic development, and our own health.



Image source: www.fao.org

Despite their importance, plants are increasingly threatened by the climate crisis, invasive pests and diseases and unregulated movement of people and goods. We need to strengthen the capacity of national, regional and global institutions to develop and implement phytosanitary standards and actions to improve plant health. Plants make up 80 percent of the food we eat, and produce 98 percent of the oxygen we breathe. Yet, they are under constant and increasing threat from pests and diseases.

Every year, up to 40 percent of global food crops are lost to plant pests and diseases. This leads to annual agricultural trade losses of over \$220 billion, leaves millions of people facing hunger, and severely damages agriculture – the primary income source for poor rural communities.

This is why policies and actions to promote plant health are fundamental for reaching the Sustainable Development Goals. Plants provide the core basis for life on Earth and they are the single most important pillar of human nutrition. But healthy plants are not something that we can take for granted.

Climate change and human activities are altering ecosystems, reducing biodiversity and creating conditions where pests can thrive. At the same time, international travel and trade has tripled in volume in the last decade and can quickly spread pests and diseases around the world causing great damage to native plants and the environment.

Protecting plants from pests and diseases is far more cost effective than dealing with full-blown plant health emergencies. Plant pests and diseases are often impossible to eradicate once they have established themselves and managing them is time consuming and expensive.

What will the International Year of Plant Health do?

FAO and its International Plant Protection Convention (IPPC) will lead activities to make the Year a success as well as promote plant health beyond 2020. The Year will emphasize prevention and protection, and the role everyone can play to ensure and promote plant health.

The key objectives of the Year are: raising awareness of the importance of healthy plants for achieving the 2030 Agenda for Sustainable Development; highlighting the impact of plant health on food security and ecosystem functions; and sharing best practices on how to keep plants healthy while protecting the environment. By

preventing the spread and introduction of pests into new areas, governments, farmers and other actors of the food chain, such as the private sector, can save billions of dollars and ensure access to quality food.

Keeping plants or plant products free from pests and diseases also helps facilitate trade and ensures market access especially for developing countries. For this, it is important to strengthen the adherence to harmonized international phytosanitary regulations and standards.

When combatting pests and diseases, farmers should adopt, and policymakers should encourage the use of, environmentally friendly methods such as integrated pest management, integrated water management and integrated nutrient management to help keep plants healthy whilst protecting the environment.



Governments, legislators and policymakers should empower plant protection organizations and other relevant institutions, and provide them with adequate human

and financial resources. They should also invest more in plant-health related research and outreach, as well as innovative practices and technologies. Strategic partnerships and collaborative action with all stakeholders, including governments, academia and research institutions, civil society and private sector, are also essential to achieve the objectives of the International Year of Plant Health, noted the FAO Director-General.

FAO and its International Plant Protection Convention are already leading global efforts, for example, to ensure that International Standards for Phytosanitary Measures are developed to sustain plant health and countries benefit from their wide application.

In the case of Fall Armyworm – a fast spreading, crop-munching pest – FAO has been coordinating global efforts to manage the pest and curb its spread by developing and promoting innovative technologies for monitoring and early warning, and equipping governments and farmers with the best tools and knowledge to fight the pest.



Photo: Fall Army worm has created havoc in many parts of world

On this International Year and throughout this Decade of Action to deliver the Sustainable Development Goals, let us dedicate the necessary resources and increase our commitment to plant health. Let us act for people and planet.

As a common man, we can also give our contribution for this global event. Simple things can be followed by all common peoples during the year. These includes...

- Be careful when bringing plants and plant products across borders.
- Make trading in plants and plant products safe by complying with the international plant health standards.
- Invest in plant health capacity development, research and outreach.
- Strengthen monitoring and early warning systems to protect plants and plant health.
- Support the development of healthy food by adopting organic agriculture without using chemicals.

Note: Article is based on the information available with the UNO, FAO webpage for spreading message on the eve of International year of plant health. Idea is to spread awareness about this important event.

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Plants can give you food in any conditions even it is unfavorable. Source unknown...

SECRETS OF ANTARCTICA

Antarctica, the southernmost and fifth largest continent and site of the South Pole, is a virtually uninhabited, ice-covered landmass. Antarctica (technically) contains every time zone on the planet. Antarctica is the coldest place on Earth. The temperature in the winter is cold enough to freeze water all the time. July 21, 1983 was the coldest ever day in Antarctica at -89.2 °C. It is the lowest temperature recorded 'Vostok' Russian station. The temperature in the interiors of Antarctica is much colder than the temperature on the coasts. Antarctica is protected under the Antarctic Treaty, as a natural reserve dedicated to peace and science. Antarctic treaty mission is to set the highest possible environmental standards.

Antarctica is also called the "the white continent" with its unique wildlife, extreme coldness, dryness, windiness and unexplored territories. The word Antarctica is derived from the Greek word *antarktike*, which means "opposite to north" i.e., opposite to the Arctic.

It is situated within the Antarctic Circle and is surrounded by Southern Ocean. **James cook** discovered Antarctica when he was crossing the Antarctic Circle. Of the 14 million-sq.km area, 98% is covered with thick ice sheets that formed 25 million years ago and holds 75% of the earth's fresh water. Antarctica, also known as the continent of **Science and Peace**, is situated at the southern end of the world. It is also known for its stateless civilization as till date it is the only place on earth that have not been pen down politically though claims have been made by different countries form southern hemisphere.

Antarctica has an area of roughly 14 million square kilometers but only 2.4 percent of it is exposed by land rest is covered by an ice and in winter the area is increased by 100 km in radius by the expansion of frozen ice doubling its size. At its thickest point the ice sheet is 4,776 meters deep and averages 2, 160 meters thick. This accounts 90 percent of the entire world's ice and 70 percent of the entire world's fresh water. There are lots of penguins, whales, seals, krill (the main food for whales), and even fish in Antarctica's

waters, but there are no land mammals and, as far as scientists know, no native peoples in habitat this continent. Eskimos and polar bears are found in the ARCTIC, not the Antarctic. The nearest human settlements are more than 3500km away i.e. South Africa, Australia and New Zealand.

Discovery of Antarctica

The frozen continent remains hidden from civilization till the 17th century and most of the explorers treated this voyage as something next to impossible. In 1772 Captain James Cook and his crew crossed the Antarctic circle for the first time although they discovered a few islands they did not catch the sight of Antarctica. Nearly after hundred & fifty years in 1911, a Norwegian explorer Ronald Amundsen finally made it to the South Pole. Norwegian explorer Roald Amundsen was the first human to reach the South Pole on December 14, 1911. Only 3 weeks later, a British explorer Robert F. Scott also reached there but only at the cost of his life.

Exploration of Antarctica and southern Oceans started in early 18th century for mostly fish, seal furs and whales. By 19th century, the continent was claimed and divided by seven countries. These countries along with five others signed a treaty in 1959, called Antarctic Treaty. The treaty decided to freeze all territorial claims and lays down that Antarctica is to be used for peaceful scientific purpose only. It provides for cooperation and exchange of scientific information and protection of vulnerable natural environment. India became a member of the Consultative Committee of the Antarctic Treaty on September 12, 1983 and a member of Scientific Committee on Antarctic Research (SCAR) in September 1984. Antarctica is the world's greatest natural laboratory and attracted scientist for following reasons:

Climate of Antarctica

The weather of Antarctica is very unpredictable, harsh climate making the scientific work a challenging task. There's only two seasons in Antarctica i.e. Austral summer which begins from December till February and the rest nine months are winter. The temperature always remains below freezing point except in the coastal region it rises to 5-6 degree centigrade during the Austral summer for 2 - 3 days. Average temperature is -2° to -30° C and in winter it goes below -50°C in most of the

area. Blizzard often took place and if it occurs, it continues for 5 to 10 days and in winter it is common. White out is another hurdle in Antarctica and the wind speed is very high as Antarctica is known as the windiest place on Earth. The average wind speed is 10 to 20 nautical miles (30 to 50 km/hour) but in winter it goes above 100 and 200 km/hr. Antarctica has a one full day sunlight and one full day night from 60°S and it increases as it moves further towards south and at the Vostok Russian Station, it has 6 month day and 6 month night. Antarctica has two seasons: summer and winter. Earth is tilted in space and the direction of tilt never changes. During summer, Antarctica is on the side of Earth tilted toward the sun. It is always sunny. In winter, Antarctica is on the side of Earth tilted away from the sun. Then, the continent is always dark. Scientific Research Stations receives 24 hours daylight for the period of two months from December till January and has continuous 24 hours night during the month of June and July. During the winter night, Antarctica is magnified by beautiful colorful lights called 'aurora' in the skies. The southern hemisphere witnesses 'Aurora Australis'.



Photograph: Aurora australis at 'Bharati station'.

Transport & Communication

Antarctica is connect by flight and Ship, the Air ways that enter this isolated continent is controlled by Antarctic Logistic Center International (ALCI) and it can enter only in end month of November and mid-February due to its bad weather throughout the winter. There are icy runways where planes land!!!. Inter station flights are operated by low altitude flying 'Basler' planes which can accommodate total load up to 1500kgs only .The cargo (ration for the stations) are transported only by ships and it enters after the sea ice melt i.e. early summer and leave Antarctica by the mid of March. Food and all the necessary equipment are brought by ship and stored for the rest of the expedition. The rest eight month are left abandoned as the sea water began to frost to ice. Antarctica is poorly connected by internet facilities but due to its bad weather. It is also communicable by Iridium phone (satellite phone) and expedition members are allowed restricted use. Helicopters are used to pick and drop scientist to nearby locations. Radio phones and GPS help scientist to move around the stations for sampling.



Photograph: Scientist exploring the continent.

Indian Scientific Expedition to Antarctica (ISEA)

India started the Indian Antarctic program in 1981 when first scientific expedition to Antarctica was organized and for the past 32 years continuous scientific research by Indian scientist has

been carried out. The research field was expanded with the first expedition to Antarctica in 1981.



Photograph: Penguins-The attraction in Antarctica

Dr. S Z Qasim, Secretary of Department of Environment and former Director of NIO was selected as the leader of the 21-member team. The first expedition team to Antarctica left the Indian shores of Goa on December 6, 1981, on board MV Polar Circle, a chartered ship from Norway. The team reached Antarctica on January 9, 1982 and returned to Goa on February 21, 1982, thus marking the end of their 77-day expedition. It is under the control of the National Centre for Antarctica and Ocean Research, Ministry of Earth Sciences, The program gained global acceptance with India's signing of the Antarctic Treaty and subsequent construction of the **DAKSHIN GANGOTRI**, Indian First Antarctic research base in 1983. At present India has two permanent research stations at Antarctica, Maitri and Bharati separated by 3098 km. Maitri the second Indian Research station is built on 1989, shortly before the first station Dakshin Gangotri was buried in ice and abandoned in 1990 - 1991. **MAITRI** is situated on the rocky mountainous region called Schirmacher Oasis. **BHARATI**, India's third and newest permanent research base is situated on a rocky promontory fringing the Prydz Bay between Stornes and Broknes peninsula in the Larsemann Hills area. It was constructed in 2010 and the expedition started on 2011 making India the elite group of

nine countries to have multiple base research station in Antarctica. The station has modern facilities to carry out research in various disciplines, such as biology, earth sciences, glaciology, atmospheric sciences, meteorology, cold region engineering, communication, human physiology and medicine. It has a capacity to accommodate 25 people for winter. India carries out scientific experiments in Geology, Geophysics, Meteorology, Geomagnetism, Oceanography and Biology at the then Base Camp.

Process for participating in ISEA

Recruitment for Indian Expedition starts around April and May through NCAOR, for government organization and academic institute, a project proposal are made by respective department and get recommended from NCAOR. Every expedition members had to go through 3 days medical test in Delhi at AIIMS hospital and for the winter members another one day psychiatric evaluation is carried out during the month July to August. The medically fit candidates are send to attain Mountaineering and Skiing Institute Auli, Uttaranchal, two weeks for snow Acclimatization training in September to October. Later the expedition members were given a Fire Fighting and Prevention Training at Goa and briefing about Antarctica for three days before departing from India.

Indian expedition member depart from Mumbai International Airport to Cape Town (South Africa) and from there some members were sent to Antarctica by ALCI Flight and some by Ships (Ivan Papanin Russian Ships). Indian cargo ship comes twice to Antarctica during the month of end November brining the necessary thing as fresh vegetable, food, fuel, scientific equipments and expedition members and the ship leave Antarctica by the 1st week of march taking back all the waste and back loading materials before the Sea water starts to froze to ice leaving only a handful of winter member (18 to 20) for the rest ten months. Once the ship left Antarctica no winter member can get back to the civilized world till next November.

Why scientific research stations in Antarctica?

As this hidden continent had remained frozen and undisturbed for many thousand years it provides one of the best platforms for science. The Indian Antarctic Programme is a multi-disciplinary, multi-institutional programme where atmospheric, biological, earth,

chemical, and medical sciences research are studied by India, which has carried out 39 scientific expeditions to the Antarctic till now.



Photograph: Indian 'BHARATI' station in Larsemann hills-East Antarctica

Some 150 million years ago India, South Africa, South America, Australia and Antarctica were once a huge land mass called Gondwana, it records and preserve many earth's history in its rocks and Ice. The station scientists conduct research on tectonics, oceanography and geological structures. 'Bharati' also facilitates research to refine the current understanding of the Indian subcontinent's geological history (India and Antarctica were once part of the southern part of the supercontinent Pangaea, called Gondwanaland, and their coastlines have a shared history). Antarctica is rich in mineral resources. Research such as Ice impact due to the present Global warming, meteorological impact on earth, reconstruction of Earth's history, impact of natural biodiversity in polar region due to human activities, atmospheric science, meteorite search, palaeo climate, Earth's magnetic field and many other researchers are being carried out by Indian Antarctic Porgamme. Antarctica is a place where ozone hole was discovered. Every minute things in Antarctica are being researched by more than 25 countries, from the tiniest microscopic organism like diatoms to big as whales, from the

depth of chemical composition of sea and ocean water to the height of Ozone hole depletion and the whole ecosystem are being researched.

Antarctica is a desert. It snows a lot there. When it snows, the snow does not melt and builds up over many years to make large, thick sheets of ice, called ice sheets. Antarctica is made up of lots of ice in the form of glaciers, ice shelves and icebergs. Antarctica is too cold for people to live there for a long time. Scientists take turns going there to study the ice.

Tourists visit Antarctica in the summers. Most cruises to the continent visit the Antarctic Peninsula, which stretches toward South America. The peninsula's isolated terrain also shelters rich wildlife, including many penguins. The oceans around Antarctica are home to many types of whales. Antarctica is also home to seals and penguins. Antarctica has no trees or bushes. The only plants that can live in a place that cold are moss and algae. There are rare birds in Antarctica (skuas, giant petrels, snow petrels, Cape petrels, fulmars & storm petrels); as well as other animals and weird things (Weddell seals, crabeater seals, leopard seals, lichen, algae, fish) for zoologist to study.

Satellites images are used to study Antarctica changing shapes and linked to climate change. Climatologists want to know how Antarctica is changing. Scientists want to know what the changes in Earth's climate are doing to Antarctica's ice sheets. They also want to know what changes in Antarctica's ice might do to Earth's climate. One tool that NASA uses is ICESat. That stands for the Ice, Cloud and land Elevation Satellite. Using ICESat, NASA can measure changes in the size of Antarctica's ice sheets. ICESat also helps NASA understand how changing polar ice may affect the rest of the planet. Melting ice sheets in Antarctica may change sea levels all over the world.

NASA sends teams to Antarctica to learn more about the planet Mars. Antarctica and Mars have a lot in common. Both places are cold. Both places are dry like a desert. NASA tested robots in Antarctica that later landed on Mars. NASA conducts astronaut nutrition studies in Antarctica. Like people that are in Antarctica in the winter, astronauts in space are not in the sunlight. The sun helps the human body make vitamins. Scientists study people that visit Antarctica to learn how to help astronauts in space get enough vitamins.

Antarctica is a good place to find meteorites, or rocks that fall from space to Earth. Scientists find more meteorites in Antarctica than any other place in the world. Meteorites are easier to see on the white ice. Also, meteorites that fall to Antarctica are protected by the ice for a long time.

Antarctica is a land of free pollution as human being was kept away from it. No vegetation except in a small region in west peninsula and a few mammals only at the coastal region making it cleanest environment and in order to prevent it from pollution strict rule have been kept in action by International bodies. Some of the Antarctic rules it say no country can claim a territory, no economic activities. No scientific station is allowed to dispose a single waste in Antarctica, even food waste and human waste are stored and brought back by ship. Many of the Area are covered under ASPA (Antarctic Special Area Protected) where entrances to that area have to permit by international bodies.

Celebrated Indian geologist Sudipta Sengupta and marine biologist Aditi Pant were part of the Third Indian Expedition to Antarctica that ran from Dec 3, 1983, to March 25, 1984 and first Indian women to step on Antarctica. Since then, some 50 women have been to Antarctica from India for science.

At least 11 children have been born in Antarctica. Emilio Palma was the first child born in Antarctica, born on 7 January 1978 to Argentine parents at Esperanza, Hope Bay, near the tip of the Antarctic peninsula. The first female born in the Antarctic Continent was Marisa De Las Nieves Delgado, born on May 27, 1978.

Antarctica is to travel beyond everyday experience and to achieve the extraordinary. Explore a land of pristine beauty and unlimited horizons, a world of snow and sky and air so clear and fresh. There is simply no place like it on earth.

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The author has participated in the 35th ISEA and stayed at 'Bharati' station for three months.

Further readings: <http://www.barc.gov.in/publications/nl/2017/2017010201.pdf>

Picture gallery.....



Photograph1. Science Utsav inauguration programme at Gujrat Bhavan, Vashi on 11th January 2020.



Photograph 2. Participants during Science Utsav, Vashi.



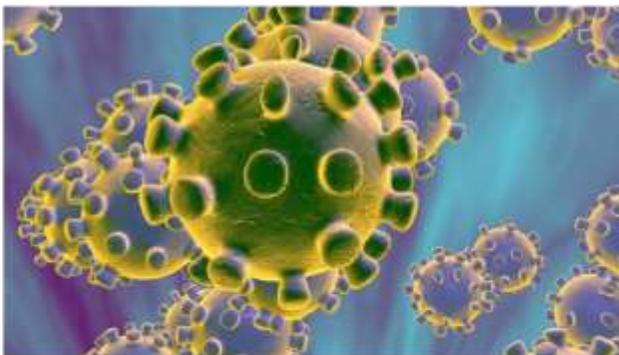
Photograph 3. Science Exhibition as a part of Science Utsav, Vashi.



Photograph 4. Participants during Science Exhibition as a part of Science Utsav, Vashi.

DON'T MISS IT.....
COMING UP IN NEXT ISSUE No 5
(April to June 2020)

- 1. CORONA VIRUS: THREAT TO HUMAN MANKIND!!**
- 2. NAVI MUMBAI SCIENCE FOUNDATION'S "SCIENCE UTSAV"**
- 3. STUDENT'S CORNER**
- 4. TEACHER'S PAGE**
- 5. PARENT'S VIEWS**



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

NMSF Events Calendar 2020

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

Science Utsav

Fun with Science from 15 Feb to 15 March

Pre-RMO

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

HBBVC Classes April to September (except May) every Sunday

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

RMO & Science Club every Sunday

Nobel Laureatism writing

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

Children Science Congress

HBBVC practicals full day

World Nuclear Energy Day



Nothing in life is to be feared,
 it is only to be understood.
Now is the time to understand
 more, so that **we may fear less.**

– Marie Curie