

KAP'S YOUNG SCIENTISTS PROGRAMME

**REPORT ON NATIONAL SCIENCE DAY CELEBRATION AT SICA
22/02/14, SATURDAY**

**BY,
I.G.ACHSAH,
LEADER, GREEN TEAM.**

“In science the credit goes to the man who convinces the world, not to the man to whom the idea first occurs”

-Francis Darwin

“Thinking is the capital, Enterprise is the way, Hard Work is the solution”

- A.P.J. Abdul Kalam



On 22nd February, Sigma College of architecture had some unique visitors. The visitors were none other than we, the Young scientists of KAP. With happy spirits, I reached the destination with my Dad by 8.15 am. A cool breeze blew towards us and offered us a red carpet welcome to that magnificent college. Its surrounding proved to be the right example for the concept 'Eco Green'. We saw some college

students wondering about our uniforms. They looked us with a puzzled mind, seeming to guess who we might be? Some others came running towards us with a sweet smile in their face. They offered us "Chandanam" and "Karkandu" as a mark of welcoming us. Soon, the college bus carrying the other young scientists arrived. All of us went inside the assembly hall with a joyful mind as we were to celebrate the **National Science Day, the birthday of a man of credit who convinced our nation with a Nobel Prize, i.e. Dr. C.V.Raman**, a celebrity and a great scientist who discovered the "Raman Effect". We also had immense pleasure in our minds as we were to express the fruits of our hard work in coordinating the sessions for the day. Our minds were trembling to meet Dr. Karthigesan, ISRO Propulsion Complex, Founder and Director.

After a few minutes, at about 8.30am, the inaugural meeting began. **S. Varsha of Maroon Team** was the MOC. She greeted the gathering and invited the dignitaries to the Dias. The dignitaries include:

- Ⓢ Dr. James Wilson, Chairman, SICA
- Ⓢ Dr. Karthigesan, ISRO Propulsion Complex, Founder and Director
- Ⓢ Mr. Mullanchery. M. Velian, KAP Organiser
- Ⓢ Captain Bennet Singh
- Ⓢ Dr. Gladis Wilson, Secretary, SICA
- Ⓢ Er. Ingersol, Scientist, ISRO Propulsion Complex
- Ⓢ Mr. Joseph Newman Fernando, Principal, SICA

Then, the Tamil Thai Valthu was sung by the students of Maroon Team as a mark of invocation to Mother Tamil. Subsequently, the dignitaries lighted the Kuthu Vizhakku, according to the renowned Tamil tradition. Again, Varsha proceeded the session and gave a brief account about the significance of National Science Day. The interpretation she mentioned, "**Dr. Raman considered nature as his best teacher**", inspired me a lot. She also detailed about his great feat of discovering the Raman Effect. She also listed out the **Science day** theme for a sequence of about 5-6 years. The **theme for this year 2014 is "Fostering Scientific Temper and Energy Conservation"**. Her impressive speech about Dr. C.V.Raman was remarkable.

Next, Velian sir gave the Introductory Address. He hailed about SICA, the top most architecture college in Tamil Nadu. He appraised Dr. Karthigesan for his majestic presence amongst us. His humble mindset that brought him amongst us was admirable. Also, Velian sir glorified his achievements. Our little minds were glowing and glamering to have such a great personality in our midst. Really, all of us felt immense pleasure to have him with us. Later, all of us gifted him a rose. I hope he would have felt as in a bed of roses by all our greetings towards him. A memorandum was presented to him as a mark of respect. He also was honoured with a garland by all team leaders. All the other dignitaries seated in the Dias were also honoured with a 'Ponnadai'. The KAP officials who were present there were also glorified by Velian sir.

Then, Dr. James Wilson, the Chairman of SICA, gave the Presidential Address. He gratified Velian sir for his successful feat of developing and nurturing KAP day by day. He also hailed about his habit of reading and thinking that paves way for the victory and insisted us to follow his example. He also admonished that Dr. C.V.Raman, a native of Tiruchy is a dedicated man. He also thanked Dr. Karthigesan for his arrival here to make this day a memorable one. He also wished all of us to have a colourful, wonderful and a colourful session. Subsequently, Varsha mentioned the achievements of Dr. Karthigesan and invited him to give his felicitation. By the time, the Sigma air was filled with enthusiasm. Dr. Karthigesan appreciated the efforts of KAP and Sigma College. He hailed both as the foundation for the society building. He also stressed that **individual development is more important for country development**. He also narrated a short story about the two children of a drunken father. One child thought in a negatively, followed his father's example and lived in an evil manner, while the other thought in a positive manner and led a good living. This story made us the importance of choosing the right direction in our life. "At this present world, science and technology are very important", he asserted. He referred an alerting fact that in future rice would be produced in industries. He also motivated us to rectify negative or wrong thoughts and develop positive thoughts in our minds. He also specified the current advancement of space technology. He pointed out the merits and demerits of wind energy to generate power at this present situation. Finally, he ended up his address by greeting all of us to have a successful function. His talk

about our country's development made us proud to be an Indian. Then, Captain Bennet Singh proposed the Vote of Thanks. He also glorified the time management skill of the dignitaries. He also motivated us to avail the opportunities that we get and ended up by alerting "Your future is in your hands". Later, Ethazl of Red team entertained and refreshed our minds with an enthusiastic dance performance. Really, it was superb. Then, we had a tea break for about 10 minutes.

After the break the theme lecture session began.

Theme Lecture I:

"Space is an inspirational concept that allows you to dream big".

- Peter Diamandis

- Session Coordinator: V.Steffy
- Topic: Space Technology for National Development
- Lecture: S. INGERSOL (Scientist, Group Head, ISRO Propulsion Complex Magendragiri)

V.Steffy of Red team gave a brief talk on Space

Technology and rockets:

- ✓ Contrieve Rockets were discovered by William Contrieve in 1804. These are the predecessors of the presently used defence rockets.
- ✓ Sequence of Indian Rockets:
 - Bhaskara I 1979
 - Rohini I 1980
 - Bhaskara II 1981
 - INSAT- IA 1982
 - INSAT-IB 1983
 - GSLV 2001
 - Edusat 2004
 - INSAT- 4A 2005
 - Chandrayan-I 2008
 - Mangalyan Nov 5, 2013

Finally, she ended up her talk with a statement which says: **"India's space achievements are the dreams of yesterday, the hopes of today and the reality of tomorrow"**.

Then, **Scientist Ingersol** was invited to give a ppt on the topic: **"Space Technology: Application for the Society"**. Some of the facts he stressed include:

- All of us are fascinated about space. Earlier, kids were given food by pointing out moon. But now, man has conquered moon himself.
- At present, space technologies have a change in their trends.
- The distance between the Earth and the Moon is about 3, 84, 000 km. India's Chandrayan I space probe had reached the moon within 21 days. It's a great feat.
- **A rocket is a vehicle in which a satellite travels.** The average speed of a rocket is 12 km/s (or) 40,000 km/hr. Within two minutes, it can travel a distance which accounts from Kashmir to Kanyakumari. It has such a wondering pace several times faster than a bullet.
- Mars is more than 40, 000 crore kilometers farther from Earth. Indian probe Mangalyan is on its odyssey to Mars to conquer this feat.
- To reach Mars, Mangalyan must go around the sun, in order to acquire the gravity acceleration from the sun.
- Mangalyan takes 10 months to reach Mars.
- India, unlike other nations, spends money wisely to design space missions. An instance for this statement is as follows: "The US space probe to Mars (named MAVEN), costs 10 times more than Mangalyan. It was sent after a few days when Mangalyan was launched.
- The cryogenic engine of Mangalyan was tested and designed in Mahendragiri. This is a great feat of glory for our district as well as our nation.
- Dr. Vikram Sarabai is the visionary of Indian space programme. He had quoted that, **"We must be second to none in the applications of advanced technologies to the real problems of man and society."** He had assurance in his mind that, space technology will help to reunite people and solve problems.

- Ingersol sir inspired us to develop a questioning mind to explore and understand space.
- Space technologies are developed for two main purposes:
 1. For human benefit on Earth.
 2. To answer philosophical questions of the Universe.
- Mangalyan is sent to Mars to reveal the following truths:
 - ✓ Is methane present in Mars? (Then, life may have existed)
 - ✓ How Carbon dioxide is striped in Mars?
- Mangalyan will also capture images of Mars. It has six payloads which will start working by September 24, 2014 and continue to explore Mars for about one year.
- Dr. A.P.J Abdul Kalam visualized that by 1920 or 1925, India will surely be the world first or second nation in the world. These words inbuilt some confidence within us.
- Dimensions of Indian Space Programme are as follows:

Space infrastructure	Launch vehicles (PSLV, GSLV)
Space Craft	(LEO, GEO & beyond)

- Ground segment includes:
 - ✓ Data Acquisition
 - ✓ TTC Network
- There is an international cooperation in space programme. It is applied in various fields. Indian Space programme is attempting to stand stuffed on its own legs.
- ISRO came into existence in 1962 at a church in Thumba, Thiruvananthapuram. At the beginning, small pencil shaped rockets were transported using cycle carriers. The first rocket was launched in 1963. It was an Atmospheric Sounding Rocket with a payload of just 5kg or 10kg. Subsequently, the Rohini series were launched.
- This space era had developed to a boundless extent that we have recently used even the latest cryogenic technology to launch GSLV D5. This technology had been adopted by only in six countries in the world. We should be proud enough to say that India is one among those.
- Only four countries in the world are advanced enough to send and bring back satellites. India is one among those countries too. Such a recovered space craft is kept for display in Thumba museum.

- This year, *GSLV Mark III* will be sent in an unmanned *Space Groove Module*. Its hardware was delivered one month ago by *Hindustan Aeronautic Ltd*.
- A lot of companies like *Godrej*, supplies cryogenic missile parts.
- The uses of space science include:
 - ✓ Communication:
 - Audio-2G
 - Video-3G
 - Data -4G
 - ✓ Remote sensing
 - To acquire a great deal of knowledge about the whole universe from a corner of this widespread world.
- Satellites are beautiful, wonderful platforms in space. They seem to be stationary on looking them from the Earth. They take one day to orbit the earth. The distance of their orbits vary depending on the types of satellites:
 - ✓ 100 km- spy satellites
 - ✓ 36,000 km- communication satellites
- Orbits are of various kinds like:
 - ✓ Geo-synchronous orbit
 - depends on earth's gravity.
 - E.g. Satellites like communication satellites
 - ✓ Helios-centric orbit .
 - depends on sun's gravity.
 - E.g. `Mangalyan'.
- **EDUSAT is an Indian educational satellite. India is the only country to have launched an educational satellite as its prime aim is socio-economic development of the people.**
- Satellites observe objects in earth through all electromagnetic spectrums. There are many types of spectrums including:
 - ✓ X - Ray spectrum
 - ✓ Visual spectrum
 - ✓ Infrared spectrum
- A spectrum can cover the whole universe.
- The applications of remote sensing satellites are:
 - ✓ To check the increase and decrease of crop yield
 - ✓ To analyze the level of water table
 - ✓ To detect forest cover etc.

- Recently, a Flash flood attacked Uttarkhand and killed a lot of people. To make a note of the flood's extent, remote sensing satellites were used. This instance proves the uses of satellites in disaster management..
- Satellites also play their role in navigation, which means, to locate a place. GPS technologies are being used widely for this purpose. Earlier, India depends on US for navigation satellite. Now, we have sent our own navigation satellite (IRNSS) through PSLV rocket, to enable us to stand on our own feet. Soon, seven more will be sent and thus, will form a constellation of satellites.
- Countries like China have their own honour for their increased economy contributed by space science and technology. So, India should advance in its space technologies and earn a high peak of honour.
- The light weighing carbon fibres used in aircrafts for re-entry are implemented in making artificial development. This act was motivated by our former President Dr. APJ. Abdul Kalam.
- We also viewed slides on the following mentions:
 - Sequence of Indian satellites (from Apple 1, launched in 1981)
 - Resources and Challenges of India
 - India's priorities:
 - ✓ Food
 - ✓ Water
 - ✓ Disaster Support
 - ✓ Health
 - ✓ Education
 - ✓ Weather Forecasting etc.
 - Photos of Water Nodal Points
 - Modern satellite uses:
 - ✓ Communication
 - ✓ Civilian uses etc.
 - So far, India has launched:
 - **1 LUNAR MISSIONS**
 - **55 SATELLITE MISSIONS**
 - **22 FOREIGN MISSIONS**
 - **29 LAUNCH MISSIONS**

Other space achievements of India are as follows:

- **India is the first country to have launched 10 satellites at a single launch mission.**
- **It has carried out a space capsule recovery experiment.**

- Satellites offer tele-medicine facilities to more than 3 lakhs Andaman patients.
- Chandrayan I had detected the presence of water in moon using TMC camera.
- Satellites are used in village resource centres.
- Apollo 11 landing plane on moon had been photographed.
- Mineral maps are made and many more.....

The New Horizons to be conquered includes:

- Energy from space
- Exploration
- Behavioral study of humans in space environment
- Human mission to Mars and Moon.
- Reusable launch vehicles.
- Low cost access to space.
- Space tourism
- Electrical propulsion
- Nuclear propulsion etc.



We also had a glance of India's future vision till 2025. This made us understand the need of having a future goal. We also viewed the glamoring image IIST(Indian Institute of Space science and Technology)- ISAT University built by ISRO. With this, Ingersol sir's knowledge - treasured ppt came to an end. Then, Steffy gave a feedback and proposed her thanks to Scientist Ingersol. By the way, Session I

ended up.

Theme Lecture II:

"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another."

— Mahatma Gandhi

- Session Coordinator: Achsah
- Topic: Environmental protection
- Lecture: V. SUNDARARAJU (IFS, Former Dist. Forest officer. K.K Dist.)

I, **Achshah of Green Team**, gave a brief talk on Environment Protection, suggesting the various ways to preserve air, water, soil and forests. Then I invited **Mr. V. SUNDARARAJU (IFS, Former Dist. Forest officer. K.K Dist.)** to give his ppt on **Environment Protection**. By the way, a book on biodiversity, written by Mr. Joe Prakash, a multi-faced personality (i.e. actor, headmaster of Gov. School, Nalloor and Writer of many books) was released by Mr. Sundararaju.

Later on, he continued his ppt. He appreciated our observations and memory skills in giving feedbacks. He defined **environment** by the following statements:

- **The sum total of all surroundings of living organisms, including natural forces and other living things.**
- **The coordination of the living community along with the non-living things.**

He also detailed about **the landscapes present in our surroundings and their importance:**

- Forests, rivers, mountains and deserts are the common landscapes.
- The city based people depend on villages for their food.
- The village people in turn depend on these natural landscapes for the provision of food, water, fuel, agriculture, fish etc.
- A normal human uses three cylinders of oxygen, worth Rs. 700/- per day. In an average lifespan of 65 years, a man uses oxygen which worth for about Rs. 4, 92, 22, 500/-
- But, in our district, trees are being cut, hills are destroyed and soil is degraded. So, it is very essential to change the mindset of the people to protect our nature.
- We humans greatly depend on food, water, animals, plants etc. We must use them wisely.

He asserted on the **Importance of conserving environment:**

- We can't live without conserving our environment as it plays a major role in our life.
- Due to its importance, we refer our Earth to as, '**Mother Earth**'.
- In **1446**, a severe drought attacked Jodhpur of Rajasthan for about 8 years. A spiritual leader, named **Jambaji** who lived there, understood the necessity to plant trees to get rain. So, he preached 29 principles on the values of trees to the 'Bishnais' tribes. At present, trees like **Vanni (Prosopis spicigera)** and **Ilanthai (Zizypus)** are grown in Rajasthan.

- In 1730, Marwar king, **Ajith Singh** wanted to build a fort for defence. The construction required lime water, which consume a lot of fire woods. So, he ordered his soldiers to bring trees from **the 'Khejarli' village of Bishnais**. When the soldiers were about to cut the trees, a lady named **Amirtha Devi**, along with her three daughters embraced the tree and prevented the trees from being cut. But, the merciless soldiers killed them. This act made the villagers furious. They too embraced the trees. The merciless soldiers killed them too. That day, about 363 Bishnais were killed for protecting Vanni trees. This blood shedding event had inspired many people to protect trees.
- The people protected Vanni trees because their leaves can be used as fodder for animals. Jaggery can be made from them. They too help in water storage in such desert areas. Those people had the real affection towards trees.
- **Chipko Movement:**
 - ✓ In Hindi, the word **Chipko** means '**to embrace**' or '**to hug**'. This was followed by the Reni villagers of Uttarkhand. They hugged trees when it was about to be cut. It act is based on the Gandhian principle of peaceful protest.
 - ✓ Sunderlal Bahuguna is a great environmentalist, who strived for the success of this movement.
 - ✓ Also, in 1974, a lady named **Gaura Devi** and 27 women of her village protested together against cutting trees.

Mr. Sundararaju also gave a brief account on the following subjects:

The causes for environmental degradation:

- Population explosion - over population results in resources depletion
- Urbanization- conversion of villages to cities, turn the farms to houses. Kerala has a ban on this process.
- Industrial revolution- Industries must be run, without polluting the environment.
- Green revolution- uses of chemical fertilizers reduce soil fertility
- Transport- Automobiles pollute the environment
- Hydroelectric project
- Construction of dam- E.g.: Construction of Kodaiyaru dam resulted in deforestation
- Nuclear project- The Kudamkulam Project produces no much harm, but it releases hot water into sea, that kills aquatic life.
- Thermal project- burning of coal liberates CO₂.
- Excessive construction of buildings

- Lack of planting trees

The effects of degradation:

- Deforestation- more than 5000 hectares of dense Kanyakumari forests had been turned to rubber plantations.
- Desertification- lack of trees
- Loss of biodiversity- loss of forests
- Toxicification-toxic effluents from rubber sheet manufacturing areas brought to water bodies. Amaravathy River is polluted by effluents from dye factories.
- Acidification-industrial wastes
- Global warming-rise in sea level, temperatures etc.
- Depletion of ozone layer- by pollution

The causes of global warming:

- Air pollution- automobiles, factories
- Water pollution-industrial effluents
- Soil pollution-e.g.Endosalphan pesticide used in Kasarcode, Kerala for cashew plantations, caused diseases among humans and reduced soil fertility.
- Noise pollution- automobiles
- Dust pollution-
- Radioactive pollution
- Oil pollution
- Pesticide pollution
- Plastic pollution

Who is the main cause of all these exploitations?

The answer is '**Mankind**'.

Protecting the environment is in our hands. "Environment is our heritage left back to us by our forefathers; it is our duty to hand it over to our future generations as an even better environment." Our forefathers used natural resources judiciously, but we exploit them. The economic stability of a country lies on its well-maintained environment. To maintain this stability, every country must have at least one-third of its land covered with dense forests. INTAC (Indian Natural Trust on Agriculture) is an organization that conducts seminar each year on protecting nature.

How to limit degradation?

- Awareness on 'ecocide', 'environmental crises' and 'eco terrorism' should be created among people.
- Environmental studies should be introduced in schools and colleges.

- Student must acquire knowledge on environmental values and ethics and values.
- Organizations such as 'CITES', 'EPA', 'EXNORA' etc. should be encouraged to nurture the environment.
- Movements like 'Ganga Cleaning Project' and 'Chipko movement' should be implemented and treated with importance.
- 'Earth watch', 'Earth scan' and 'Earth walk' services should be used by people.

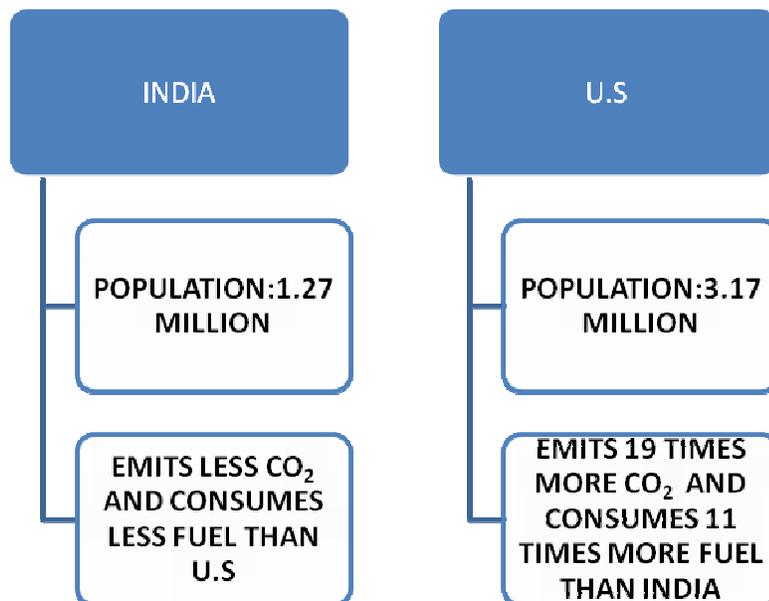
The efforts of UN in stopping environmental degradation:

- Organization of the 'INCED' or 'Earth Summit'. This summit had been conducted since 1972. Each year it is held in various places. 1972-Stockholm, 1982-Nairobi, 2012-Rio De Genero.
- Leaders from 115 countries, 6000 representatives from 170 countries, 10,000 governmental organizations, 20,000 NGOs and 8000 media participated.

Differences of opinion:

- G7: 7 developed nations like UK, US, Japan etc.
- G77: 133 developing nations like Bahrain, India, Iraq, Kenya, etc.

Comparison between India and U.S:



Environmental ethics:

- Lead harmonious life with nature.
- Conserve environment.
- Respect mother nature
- Avoid craze for wildlife products.
- Protect wildlife

- Preserve forests
- Conserve biological, cultural heritage
- Worship rivers

The monuments of Hugo Wood:

Hugo wood planted more teak trees. A lot of trees are planted around his tomb. An inspiring statement is written on his tomb, which is as follows: **"If you want to see me, please look around"**.

What should we do to protect our environment?

- Plant more trees.
- Go for a balcony garden.
- Protect pollinants like butterflies and insects.
- Develop a capacity of identifying birds.
- Limit the use of papers
- Support environmental projects.
- Always buy organically grown produce.
- Harvest rain water.
- Use alternative energy sources.
- Use bicycles.
- Use CFL bulbs.
- Use- bio pesticides.
- Turn off lights and fans when not needed.
- Try to participate in firefighting events.

Four main things that every individual must know:

1. Where do the things we consume come from?
2. What do we know about the place you live?
3. How are we connected Earth and other living things?
4. What is our purpose and responsibility on this earth?

. Finally, he ended up by saying:

"Nurture trees to nourish birds, animals and insects.

Nurture trees to nourish water and air.

Nurture trees to nourish Earth"

These words were very impressive. With this his ppt ended up. Then, I gave a feedback and proposed my thanks to Mr. Sundararaju. Then, Joe Prakash sir honoured Mr. Sundararaju with a shawl. This marked the end of session II. Later, we had our meals at the college cafeteria by about 1.15pm. After, the lunch break by about 2.00pm, again the theme lecture sessions continued.

Theme Lecture III

"The release of atomic power has changed everything except our way of thinking ... the solution to this problem lies in the heart of mankind. If only I had known, I should have become a watchmaker."
— Albert Einstein (1945)

- Session Coordinator: Jeshwini
- Topic: Nuclear Technology Needs
- Lecture: A.BENZIGAR RAJAN (Scientist, Dy. Manager, ISRO Propulsion Complex Magendragiri)

Jeshwini of Green team gave a brief introduction on the topic:

- Energy is the most important requirement for mankind.
- Burning coal produces only little electricity. At present, we are in demand of more electricity. So, we use coal to produce it.
- Thermal Energy releases more CO₂ but, nuclear energy doesn't release any.
- Nearly, 30 billion tons of CO₂ is released per year. This results in more than 4,81,000 deaths.
- **India is the leader of thorium, the future nuclear material, in world level. India has more than 6, 50, 000 tons of thorium.**
- Nuclear energy has its application in military equipments, medicine field(MRI scan) etc.

Then, **Scientist. Er. Benizikhar Rajan** was invited by Jeshwini to present his ppt. Mr. Edwin Sam honoured him with a shawl as a mark of respect. His ppt was on the topic '**Nuclear Technology Needs**'. He asserted the following facts:

- **Our universe has a huge nuclear power plant called Sun.** The world is running on its nuclear energy.
- **The basic particle of nuclear energy is atom.**
- **Atom contains three particles:**
 - **Protons- $1.672 \times 10^{-27}\text{kg}$ - Positive charge**
 - **Neutrons- $1.674 \times 10^{-27}\text{kg}$ - Neutral charge**
 - **Electrons- $9.102 \times 10^{-31}\text{kg}$ - Negative charge**
- The weights of protons and neutrons are almost equal and both together constitute the nucleus. The electrons revolve around it in orbits.
- **Nuclear Energy is also called Atomic Energy.**

- Commonly, there are five forms of energy:

1) Heat energy :

The fast movement of electrons from one to the other end of a medium results in collision. This collision liberates heat energy.

2) Chemical energy :

Chemical energy is stored in foods. E.g.: Rice. It can be also termed as bonding of atoms. As the bond breaks, chemical energy is evolved. E.g.: batteries, Lechlanche cell.

3) Electromagnetic Energy :

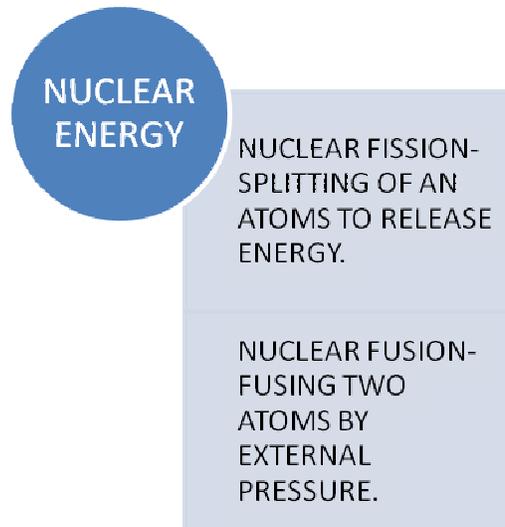
Used in radios, televisions etc. We can't live without it. Different coloured lights have varied concentrations of this energy. Black colour has the highest concentration.

4) Mechanical Energy :

The energy brought about by movement.

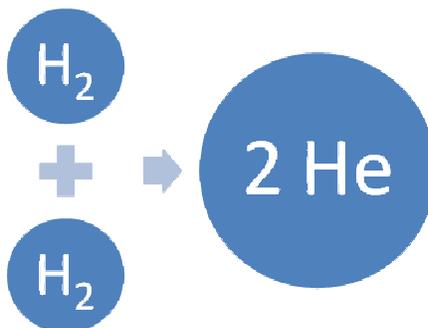
5) Nuclear Energy :

It is produced in two forms:



:

Sun undergoes nuclear fusion:



- Nuclear energy is the most concentrated form of energy.

- **Burning 1 ton of coal = Burning 10 kg of Uranium**
- **Nuclear power countries:**
 - **Leaders- Russia, USA**
 - **2nd rank- France, England**
 - **Other countries- India, China, Iran, North Korea etc.**
- There are 440 nuclear power plants in 31 countries of the world. They produce 350 Giga watt of electricity. 31 nuclear power plants are under construction.
- In India, Kudamkulam and Jeethapur (Maharashtra) power plants are under construction. Last week we witnessed the inauguration of an Indian power plant at Rambhaka, Haryana. It can generate about 2000 Mw of electricity.
- As per Indian scenario, at present we require about 1,50,000 mega watts of electricity.
- In 2020, we may require about 250,000 mega watts. But now, coal mines are depleting as in Neyveli. To satisfy this, we use nuclear energy.
- Three types of reactors are under usage:
 - Light water reactor
 - Heavy water reactor
 - Vodo Vodo Energy Reactor(VVER)
- The names of few Indian power plants are listed below:
 - ❖ Kalpakkam (Tamilnadu)
 - ❖ Narora (Gujarat)
 - ❖ Rawatbhata (Uttar Pradesh)
 - ❖ Tharapur (Rajasthan)
 - ❖ Kudamkulam (Tamilnadu) etc.
- **Isotopes:**
 - ❖ In most of the atoms, the protons, neutrons and electrons are equal in number. While in some atoms, protons and electrons are equal in number, but neutrons are deficient. Such atoms are known as isotopes. E.g. Uranium 235(heavy metal)
 - ❖ When these isotopes bombard with neutrons, they break up to release to huge amount of heat.
 - ❖ Dethorium and Pentium are the commonly used light isotopes.
- The process undergone in a conventional nuclear power plant:
 - A controlled nuclear fission chain reaction
 - Heats water
 - Produce high-pressure steam
 - That turns turbines

- And generates electricity
- Nuclear fission is a controlled fission and also a chain reaction. The controlled chemical used is Boron. If there was no control, the reactor blasts. Then, we viewed the block diagrams of nuclear and fossil power plants. Scientist. Er. Benizikhar Rajan explained its working to us.
- Light water reactors vs. Heavy water reactors
 - Light water reactors- use ordinary water (H₂O) for the coolant used for cooling the power plant. E.g.VVER, Kudamkulam etc.
 - Heavy water reactors- use Dethorium Oxide (D₂O) for the coolant. E.g. Jeethapur
- The problems in nuclear power plants are manmade.
- **Advantages of Nuclear energy:**
 - In thermal plants, burning of coal liberates 25,000 tonnes of carbon dioxide per year. This causes global warming which results in the sea level rise.
 - To produce 1 Mw of electricity:
 - ✓ 1 ton of coal is burnt, which releases 1000kg of CO₂
 - ✓ Nuclear energy - Only 21g of CO₂
 - High amount of energy is produced in a relatively small area.
 - It results in large scale employments, job assurances in techno parks.
 - Applications in medicine field, food preserving as in New Zealand etc.

Then, Jeshwini gave a feedback and expressed her gratitude to scientist Benizikhar Rajan. With this session III got over.

Theme Lecture IV:

"Let food be thy medicine and medicine be thy food"
— Hippocrates

"Eat healthily, sleep well, breathe deeply, and move harmoniously."
— Jean-Pierre Barral

Session Coordinator: Fathima

Topic: Health and Medical conditions
Lecture: Dr. A.JAYALAL (General Secretary IMA Tamil Nadu)

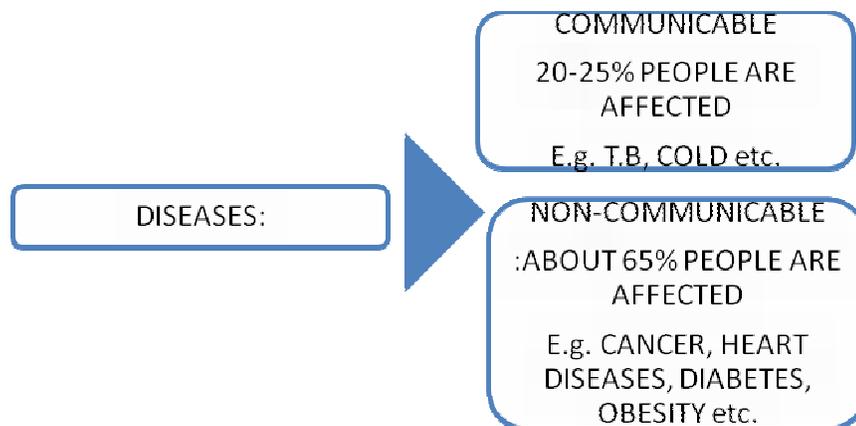
First, **Fathima of Green Team** gave a brief introduction on the topic. Her talk began with a well known proverb, "Health is Wealth". She defined heath as a

state of physical, mental and social well-being. She admonished that rural areas must be developed like urban areas and created awareness amongst us regarding the various diseases and factors affecting the health of the people.

Then, she invited **Dr. Jayalal** to the podium, in order to present his ppt. He asked us our opinion about how we take health as. We gave different answers. He summarized all our opinions and designed a fit definition for health that, " a **complete state of physical, mental and social well-being and not merely the absence of disease or infirmity**". He listed out the **6 dimensions of health**, which includes:

- Emotional wellness
- Intellectual wellness
- Spiritual wellness
- Occupational wellness
- Social wellness
- Physical wellness

- ✓ He also emphasized that, "An angry man cannot be healthy". He also narrated a story to explain this concept.
- ✓ "Most people don't die. But, mostly they kill themselves with their emotional, social and occupational diseases", he asserted.
- ✓ Diseases may be of two types:



- ✓ He said an alarming fact that, by 2020, the percent of non-communicable diseases has a high risk of increasing up to 70-75%
- ✓ Following are some of the causes for this gradual increase:
 - Use of tobacco

- Unhealthy diets
 - Physical inactivity
 - Harmful use of alcohol etc.
- ✓ "Television is the main cause of lack of exercise", he highlighted.
- ✓ Earlier, if the BMI (Body Mass Index) of a person is above 29, that state was referred to as obesity. But now, the limit has been reduced to 25.
- ✓ Another cause of obesity is junk food.
- ✓ 1 Parotta (800 calories) = 8 Idlies (each one has 100 calories). This truth made us wonder.
- ✓ **"Big food, big size, big diseases"**, he admonished.
- ✓ He also compared the olden days kitchen with the pity state of present day kitchen.
- ✓ The best medicine for obesity is exercise (for at least 20-30 minutes per day).
- ✓ **Lifestyle diseases:**
- **Near sightedness**
 - Caused when vision is affected due to over exposure to television.
 - **Domestication of children**
 - Results in lack of strong mind and heart among the students.
 - Risk factor of teen suicide.(Suicide numbers peak in Kerala)
 - .He advised us to **"Hear no evil, See no evil, Speak no evil and Post no evil"**

To avoid all sorts of evils and to live in harmony we should:

- Build confidence
- Love our neighbours as our self.
- Have a will in mind as per the proverb, **"Where there is a will, there is a way"**.
- **Avoid fear as fear itself stands for, " Forget Everything And Run"**
- Face everything and rise. For this, he stated Walt Disney as an example.
- Consider mistakes as the proof of our life. Dr. APJ. Abdul Kalam had said,
"Your best teacher is your last mistake"
- Aim high.
- Follow the food chart and include more natural foods.
- Positive chart to follow:

- ✓ Forgiveness
- ✓ Mercy
- ✓ Serenity
- ✓ Joy
- ✓ Courage
- ✓ Hope
- ✓ Praise
- ✓ Honesty
- ✓ Smile
- ✓ Patience
- ✓ Laughter
- ✓ Cheerfulness
- ✓ Trust worthy etc.
- Neglect the negative chart:
 - ✓ Jealousy
 - ✓ Hatred
 - ✓ Sorrow
 - ✓ Enmity
 - ✓ Greed
 - ✓ Anger
 - ✓ Envy
 - ✓ Laziness
 - ✓ Pride
 - ✓ Fear
 - ✓ Blame etc.

With these advices, Dr. Jayalal's ppt ended. Then Fathima thanked him. Then he was honoured by Mr. Balakrishnan and Mr. Samraj honoured him with a shawl. With this session IV ended.

Theme Lecture V:

"It's clear that agriculture, done right, is the best means the world has today to simultaneously tackle food security, poverty and environmental degradation."

- Irene Rosenfeld, Chairman and CEO of Kraft

Foods.

Session Coordinator: Meera

Topic: Food and Agricultural Challenges

Lecture:
Kuttakuzhi)

Dr. SUGIN HERBERT (Primary Health Centre,

Meera of Blue Team gave a brief introduction about the topic. Her talk proved all of us that "Discovery of Agriculture is the greatest discovery on the Earth". She invited Dr. Sugin Herbert to give his ppt on the topic "Food and Agricultural Challenges". He gave us a lot of details about the topic:

- Food includes any substance consumed by an organism to provide nutrient support.
- Agriculture includes cultivation of crops and rearing of animals.
- The objective of the given topic is "to know about the challenges in cultivation and to get right nutritional food for our body".
- In 2050, there will be a steep rise in population. So, to meet the food demand of this huge population, the production has to be raised to about 60- 70% or else, a pity state would exist. Sir showed us a picture to depict this state.
- The challenges faced by today's world and the solutions are as follows:

➤ **Climate change:**

Climate change, caused by global warming, makes the conditions and temperatures unsuitable for plant growth.

➤ **Soil degradation:**

The creatures in the soil, including earthworms (farmer's friend), sand bee etc. are declining now. This reduces soil fertility.

➤ **Water scarcity:**

i) **Rainwater Harvesting**

- ✓ This problem can be rectified by us for some extent.
- ✓ We must practice rain water harvesting to conserve water. At present, this is not done actively. So, we must stimulate this.
- ✓ The rainwater should be used for some purposes, otherwise it must be sent to ground because rain is the gift given to us by God.
- ✓ Doctor requested us not to waste even a single drop of rain water that falls into our house campus. These words awared all of us.

ii) **Drainage System**

- ✓ Today's drainage acts as a store house for harvesting mosquitoes.
- ✓ So, we must try to reuse the waste water by some means to prevent water scarcity.

➤ **Over population:**

Developing countries have a steep population rise than the developed countries. So, there is scarcity for food.

➤ **Poor food storage:**

In India, about 1 billion kg of food grains are rotten every year. We also viewed a picture depicting the awful food storage in our country.

➤ **Imbalanced food:**

Due to our imbalanced food practices, a lot of food stuffs are wasted each day.

➤ **Malnutrition:**

This term denotes false weights, either under or over weight.

➤ **Solutions:**

- ✓ **Be a farmer:** Practice kitchen garden system.
- ✓ **Be a dietitian:** Know what you should and shouldn't eat
- ✓ **Healthy Food System:**

Sustainable food is....

- ❖ **Ecologically responsible**
- ❖ **Local**
- ❖ **Healthy**
- ❖ **Not a waste**
- ❖ **Fair and accessible**

Finally, he ended up his ppt with a story...

Once upon a time, there was a brilliant grandpa in a village. He had the ability to answer all questions we ask. But, two naughty boys in the village wanted to make him a fool. They caught a bird from the forest, hid it in their palm and asked the grandpa 'Is the bird inside alive or dead?'. The grandpa answered "**It's life and death is in your hands**". From this story, he made us understand that saving nature is in our hands. This was really a thoughtful story! Then Meera thanked Dr. Sugin Herbert and all the sessions got over.

Later, central minister, Shri.Kodiakunnil Suresh came to meet us. It was a surprise visit. I was deeply astonished to see such a great personality. Dr. James Wilson introduced him to us. In that session, Steffy of red team gave a talk on the topic, 'Industrial and ecological condition'. Then our distinguished guest gave his felicitation. He wished all of us to have a useful and fruitful day. Due to his busy schedule, he departed immediately.

Then, Velian sir informed us about our next meeting at IIST (Indian Institute of Space Technology), Valiamala to be held on 3rd of March. Then, feedbacks on our speeches and organizing ability in that meeting were given by the eminent personalities amongst us including:

- Mr. Balakrishnan, Coordinator, Red team

- Mr. Thiruvankadam
- Dr. Edwin Gladson, Coordinator, Green team
- Mr. Sajeev, Coordinator, Blue team
- Mr. Samraj
- Mr. Edwin Sam, Coordinator, Yellow team
- Mr. Johnson, Councillor, Green Team
- Mr. John Rabi Kumar, Coordinator, Maroon team
- Mr. Joseph Newman Fernando, Principal, SICA
- Dr. James Wilson, Chairman, SICA

All of them appreciated us about our performance that day. They also motivated us to come prepared to IIIST so that we could understand better about the space mysteries. Then, Captain Bennet Singh gave the vote of thanks. Subsequently, all of us chimed the Tamil Thai Valthu and the meeting ended up by about 4.30pm. Later, we had tea and then all of us departed to our homes with happy spirits and a fulfilled mind.

I got immense benefits by this meeting. I thank Mr. Mullanchery. M. Velian for giving me this opportunity. My special thanks goes to Shri. Karthigesan, the founder and manager of ISRO, Mahendragiri for his generous mind to spend his time with us amongst his busy schedule. The knowledge about science had entered our tender minds. I dedicate my sincere thanks to all the eminent personalities who were responsible to inculcate such vast knowledge in our minds. I wish I got much more opportunities in future.

I express my profound gratefulness to the KAP.