

KUMARI ARIVIAL PERAVAI
YOUNG SCIENTIST PROGRAMME 2014-2015
TRAINING ON MONITORING SUSTAINABLE ENVIRONMENT THROUGH
SATELLITE TECHNOLOGY

Indian Institute of Space Science & Technology, Valiamala.
23/01/2015

Gby Atee,
Green Team.



Govt. Medical College, Asaripallam. It trained us to become doctors and the next camp was a Study on Sustainable Environment. It was a two days camp which was held at various places like Thirukurumkudi Nambikovil then PSN College of Engineering and then finally at Vivasaya Seva Sangam, Puliyanakudi. With so much of eagerness I was ready for the next camp. The Coastal Environmental Study Camp was one of the best. After all these we had planned for the team meet on 04/01/2015 at Hindu Vidhyalaya School, Marthandam. It



was our first common team meet and it proved us the real power of team work. With an expectation that the next meeting would also be the best we all assembled at **Government Library, Pienkulam** on the **17th of January** for the **ARIVIAL TAMIL MUZHAKAM**. This meet endowed us with a chance to articulate our talent in our **Mother Tongue TAMIL**, and this was the specialty of this meet.

With very eagerness for visiting IIST (Indian Institute of Space Science and Technology), I arrived at the pickup point, Marthandam and as it was programmed, the bus took off at exact 6:45 am. The journey wasn't pleasant as the route taken was curvy. By 9:00 am we reached our destination, IIST, Valiamala. The welcome and infrastructure made all our travel sickness go away and after our breakfast we moved to the seminar hall. Myself Gby compeered the session. I, in my talk stated that, IIST is Asia's first Space Institute and the first in the world to offer the complete range of undergraduate, post graduate, doctoral programs with specific focus to space science, technology and applications. This unique concept took root in January 2007, when IIST was registered as a Society under the Travancore -Cochin Literary, Scientific and Charitable Societies Registration Act, 1955. The

Institute has the unique mandate of encouraging and equipping brilliant youngsters from all parts of the country to take up a career as Scientist/ Engineer in the Indian Space Research Organization. IIST functions as an autonomous body under the Department of Space, Government of India. The campus is located at Valiamala, 18 kms from Thiruvananthapuram city, on the way to the famous hill resort of Ponmudi.

The Vision of this institute is; **to be a world class educational and research institution contributing significantly to the Space Endeavors.** And its' Mission is to; **Create a unique learning environment enriched by the challenges of the Space Programme and to Nurture the spirit of innovation and creativity.**

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Dr. K.S. Dasgupta, the director, is a Ph. D guide and has supervised and is supervising a number of Ph. D students from different Institutions. He has in his credit many publications in International/National peer reviewed conferences. **Prof. A. Chandrasekar** is presently the head of the department of Earth & Space Sciences. He graduated from the University

of Madras in the year 1981, and completed his doctorate from the Indian Institute of Science (IISc), Bangalore in the year 1988. We all are pleased to be in a place with such eminent personality. **Prof. Ananth Kumar**, Senior administrative officer, has arranged this programme. **Dr. A.P.J. Abdul Kalam** is the Chancellor of this Institute. Dr. A.P.J. Abdul Kalam knows that if we like young scientist are heartened only then in the future this institute will be filled with scientists and our nation will develop. I then thanked the Institute and Kumari Arivial Peravai for giving us this kind of a valuable opportunity and then I welcomed Dr. Umaesh Khadni to converse with us.

Dr. Umaesh Khadni first gave us a valuable piece of advice which said, “one must respect two kinds of people; firstly five years older than you, secondly five years younger than you.” We must respect a person who is 5 years elder than us because he has a lot of experience which guides us in the right trial and five year younger than us are the people who are very fast. Researchers have shown that **the younger you are the more you learn.**

He added , we must learn not only for the reason of passing exams. We play games because we like it when we learn something we are exercising our brain. Exercise is bad for our health even then the doctor advice us to exercise, to make our joints and bones work. If it doesn't work for a long period of time then it will start losing its capabilities of repairing and doing the necessary works. Similarly if we don't learn for a long time our brain will also stop functioning as it should. All of us like becoming a doctor or an engineer, or scientist but none are interested in professions like finger print expert or a historian or hair dresser. These professions require a lot of skills besides. We don't

prefer these professions because we don't or we think we don't know. A teacher drinks a bit of all the tea and grades it accordingly. Some people develop new smells by blending chemicals or they go in search of it. We may find this profession boarding. But who does it, loves it so much; they are able to do it only because of their love towards it.

Sachin Tendulkar a named cricketer of India took a cricket bat where ever he went when he was young. He took it to his classroom, exam hall and even to special functions. No one could see Sachin without a bat and whenever he found time he played cricket. He advised by his matter not to play with unskilled kids, because if he plays with them he might adopt their method. Let them adopt Sachin's methods is what his trainer always insisted him.

It is possible for us to convert 'nature protection' as our profession. IIST is an educational institute. Education is not always what we learn from our classroom. Education is what we learn from the people whom we like or dislike. If we dislike a person then we learn that we shouldn't follow him and similarly if we like a person then we learn the good things in him. Then he cited the list of 'school or college dropouts.'

- Thomas Alva Edison
 - Albert Enstine
 - Write Brothers
 - Henry Ford
 - Benjamin Franklin
- Were the dropouts when education was not given more important.

Modern list, when education was everything they are milliners nit because their father was rich, but because of their hard work and curiosity.

- Bilgates
- Steve Jobs

He added a warning that, 'Just because you didn't do well in your school you want become a milliner'. We must always try to learn from our surroundings.. If we like a food which can be made only by a person then learning from that person is also education besides. Astronauts do a really risky job. They all know that their travel to space is dangerous; even then they do it because of their curiosity.

We must always be active and our mind should be alive at each and every instance. Horse never sits but stands and sleeps. Kekule is a scientist who found in his dream that molecules are hexagonal in structure. This is one of the most important things in organic chemistry. Thus curiosity is very important. Ice cream tastes good in the beginning and then the taste goes down. If we eat ice cream and sip warm water the taste will come again. This won't work if we have fever. If we children ask question all will be ready to answer. So he insisted us to ask a shopkeeper why he uses rectangular

containers to hold toffee. He also mentioned that in old shops they use rectangular containers while in newly constructed shops they use circular containers.



School creates a deep impression on the kids about science. Science is all about thinking. Asking tricky questions develop our thinking moreover. When the AC is turned off the voice seems to change and that too because of science. Cooking is the most complicated science. It is the tradition of South Indians to give Sambar and Puppod. There is science behind this moreover. Silver lines on the road safety jackets is placed

because it will reflect light even from far thus the ones travelling by the roads can locate that someone is working there.

When we look at some jobs we feel that there is no science in it. If we watch carefully a sweeper; he hits the broom before sweeping. There is also a science behind this. The sweeper realized the science by experience. When the Americans see a sweeper using wooden broom, they think why they use it, instead can't they use plastic so the trees need not to be cut and they invent something. We Indians on seeing a sweeper mark it as a low grade job and move away. Later on we import the plastic brooms invented by Americans and use it. That is why we aren't developing.

There is even a lot of science in hairdressing. Whatever profession we choose there will be science. The ways we think brings out the science in it. To be a scientist we don't need tools. All that we need are,

- open eyes
- sharp eras
- sense of taste
- feel
- curiosity
- information

Our mission needs a lot more science. When we think of a sweeper; he must not use plastic or natural ones but still he has to sweep. So what is the alternative solution to this? If we want to do something for the poor, first we must analyze how efficiently they are using their resources. Instead of boiling water and then putting rice in it, they can be advised to use the waste heat to heat the water. If the water is already a bit hot then it must be on the fire for a much lesser time. In this way we can conserve resources and can make use of it efficiently. Fridge must be placed in a ventilated place. If it is placed in a corner then it uses more electricity. We must find out how often it is necessary for us to wash cloths and follow it and moreover we must make our usage in the correct level. **'We must learn from our surroundings and be scientific in all our arguments'**. With this he congratulated the

activities of KAP and halted. After the feedback by Reshma we took a cat break, refreshed our self and were seated for the next session.

I then welcomed Prof. Dr. Chandrasekhar to give a talk. The matter which he discussed with us was weather, climate and their changes. He asserted that weather is the state of atmosphere in a particular situation at a particular place. The rain, cloud and wind determine the weather. Weather changes from day to day. The average weather condition over a long period of time is the climate. Climate changes due to global warming. Climate variability is the change in climate when considered as a whole year. Global warming is an irreversible change. **‘Climate is what we expect, weather is what you get’**, - **Mark Twain**. A 30 year average is considered long enough to define average climate for a city, state or a region. The climate change is viewed through ‘Proxy Climate data.’ If we cut a tree we can find a lot of rings around it. The width of the ring in its cross section shows the climate.

Greenhouse is a glass house which adds warmth to the plants. The glass doesn’t allow the heat waves to escape so the temperature increases. Greenhouse emits a lot of water vapor, Carbon dioxide and Methane.

1Kg of air = 30g of Water vapor

1Kg of air = 400 parts/ million carbon dioxide

Water vapor accounts 60% of the greenhouse effects. The radiation from sun (40% UV Ray, 10% infrared & 50% visible) is absorbed by the greenhouse and is radiated back. Good absorbers are good radiators. The earth absorbs more and radiates more. If it radiates more than the temperature will certainly be high. Carbon dioxide has a lot of impact though it is less than that of Water vapor. Water vapor stays in the atmosphere for just few days. But the Carbon Dioxide remains in the atmosphere for 1000s of years. The Mauna Loa does accurate measurement of the Carbon Dioxide and Methane content in the atmosphere. According to it in the year 1950 there was 300 ppm (parts per million) of Carbon Dioxide and in 2013 there was 400 ppm of Carbon dioxide, which is certainly a dreadful news. In the year 1950 there was 1000 ppb (parts per billion) of Methane while in 2013 it is 1750 ppb of Methane. The Methane emission is much less than that of Carbon Dioxide emission.

According to the researches, over the past 100 years the temperature has increased by 0.6° C and the sea level has increased by 15 cm over the last 100 years. There is a lot of radiation in the equator. If the temperature in the equator increases then the Arctic will become much colder. Thus the energy is transported from an area of higher temperature to an area of lower temperature through the sea and the atmosphere. Cold water has high density. It will sink and move towards low latitude. Thus the water from low latitude moves to high latitude. Therefore water level will be maintained. The Thermohaline circulation takes 1000s’ of years. Anthropogenic that is the human made disasters are contributing more than anything to the Global warming. Dani gave the feedback and then I welcomed the next person.

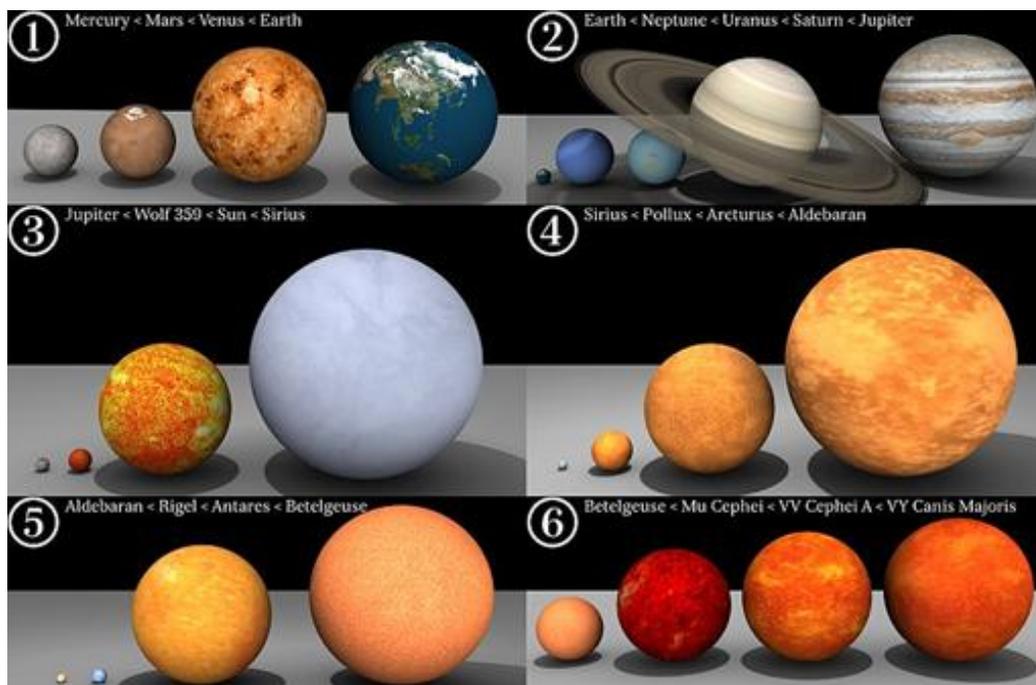
Dr. Saritha Vig, faculty in astronomy gave an introduction to astronomy. She quoted that astronomy is the study of astronomical bodies. First she gave a clear idea about Length scale;

- astronomic objects use light years
1 light year (1y) = $3 \times 10^8 \text{ m/s} \times 24 \times 3600 \text{ s} = 9.5 \times 10^{15}$
- Astronomic unit is the mean distance between the Earth and the Sun
1 astronomic unit = 1.5×10^{11}

Size:

- 1 Earth mass = 5.97×10^{24}
- 1 Solar mass = 2×10^{30}

Size Scale:



She defined solar system as ‘Sun and other celestial objects gravitationally bound to it’. There are 8 planets in our solar system. The four inner planets are called terrestrial planets (first four). They are small in size, small in mass, rocky, high temperature, high density, few moons and no rings. The other four planets are Jovian (last 4). They are large in size, lower density, and cold and have more rings and stars. Dwarf planet is defined as ‘Massive enough to be spherical due its own gravity, but not cleared its immediate neighborhood of planetesimals and is not a moon’. The 5 known dwarf planets are Pluto, Eris, Ceres, Haunea and Makemake. Planet is ‘anybody orbiting the Sun; with enough mass to form a sphere, not a satellite of any other planet and has cleared its immediate neighborhood. The asteroid belt is between the planets Mars and Saturn. Comets are small icy objects. They consist of Methane, Carbon dioxide and Hydrogen and they orbit near the sun. If they get closer to the sun then the ice melts and a tail forms in the opposite direction of the sun. There are two kinds of comet. Long period (more than 200 years) and short period comets (less than 200 years). The Cuiper belt has icy objects which are in an elliptical orbit.



Sun is something which supports life on Earth. The solar flare can spread up to 3000km. The sun flare is charged and can even affect the earth. The sun is not in a uniform circle. If we use filter to look at a sun there the sun spots will be visible. The corona can't be seen in visible light but can be seen during solar eclipse. Group of stars form a constellation. There are nearly 88 constellations. The image shows the Orion Constellation.

The colors of stars vary due to the temperature. Sun is 5800K. Red means that least heat and white denotes the hottest point. The temperature is rated from M, K, G, F, A, B and O and the sun is in category G (white & yellow). Stars are the preliminary inhabitants of the universe. In a Milky Way galaxy there are about 10^{11} stars. In the sun 70% is hydrogen and 24% Helium. At the center of our galaxy there is a nuclear bulge (Black Hole).

The first astronomic satellite of India is the **Astrosat**. It is expected to be launched this year by ISRO. Two of the instruments in the Astrosat are 'soft X-ray telescope' and 'UV image Telescope'. Raksha then questioned mam about the Asteroids. She answered that the asteroids are made of Silicate, Oxygen, Iron and Magnesium. Using the gas and the dust particles and due to the effect of gravity the temperature goes up causing nuclear fission. Our earth is 4.5billion years old and the Big Bang took place 13 billion years ago which resulted in the formation of the Universe. Sabrina of Red team gave the feedback.

Mr. Johnson then gave an important notice about the **Vpro-technologies**. The opening ceremony will be on 26th of January and the owner is Mr. Vinoth, son of Mr. Velaian. He welcomed all of us and then we moved for lunch.

After a good lunch we arrived at the lecture hall. I welcomed Prof. Ramya to give a talk on the theme **Eye in space**. She quoted satellite as a machine which sees what is unseen by we humans from the top of the earth. Satellites are Eyes in space. It takes photos and sends it to the earth and we analyze it to get information on things.



First photograph

In the 18th century the Nader from France went up on a hot air balloon and was taken in 1827 called Neipce. Then they fixed cameras in kite and flew it to take photographs. Then messenger birds like parrots took photos with the camera on their feet. Then Write Brothers captured photographs from their airplane which later developed into rockets and satellites taking photos.

When light falls on an object it reflects the light thus the image is formed. In the electromagnetic spectrum we can see only visible light. All the lights are absorbed and the color of the object is alone reflected, if no light is reflected then the object appears black. Cyan colors are blue and green. 0.4 to 0.7 is the wavelength of light that we can see. Chlorophyll absorbs all the light and reflects green, thus the leaves appear green. Satellites can sense infrared, radar and UV rays besides. Digital images are converted into numbers. Three satellites are needed for locating us on the Earth. With this she concluded and Abina gave the feedback.



We then arranged our self into 2 teams in the Remote sensing laboratory. Prof. Ramya showed the satellite image of Chennai. Using the Envy software we can view satellite image. For each cultivated crop each color is shown. Pure water won't reflect any color thus is shown in black color. The more pixels we use the clearer is the image. There are three sensors and two sensors work beyond visible light. Number of pixels into spatial resolution gives the area. The number of classes we give decides the number of features shown. Latitudes and longitudes can also be found. Then we were seated in groups and were given a system. We were also give a printed format using which we

operated and viewed the satellite image of various places. Abina gave the feedback and we moved to the Earth science/Ocean science Laboratory.



In the Earth science/Ocean science Laboratory we were assisted by Mr. Vibin, Mr. Rohit, Mr. Paragya, Mr. Subramanian and Miss. Akshya. They stated that Planetary Geology is the study of the formation of planets. When it comes to the formation of Earth knowing its parts is very important. Crust, Mantle and Core are the three major layers. They are molten because they are radioactive. Nuclear generation is based on this

they added.

The core is of two layers. The inner core and the outer core. The outer core is in liquid state and the inner core is in solid state. The reason is that liquid needs a lot of space. The liquid from the outer core fills the inner core. As there is less space it is compressed and solid is formed. They use Seismograph to study all these things. Seismograph can be split as Seism graph. Seism means earth and graph means equipment. The waves are of two kinds. Primary waves and the secondary waves. The secondary waves travel through solid. With this they concluded and Edin Jijo gave the feedback. With this the meet came to an end and after a short break we all started our journey back to our home. On our way we were informed about the next meeting which is the **Technical Presentation** on February 14th. It will be conducted at Maria College, Atoor and we will have to present a PPT on the allotted topics. The slides must include;

- topic and a sentence explanation about it, who invented it and its' use
- functional parts
- how it works
- block diagram
- advantage and disadvantages
- our ideas or opinion

We had fun on our journey back and all enjoyed our travel back. This meeting provided us with a rare opportunity to visit Asia's' first Space Institute, IIST. The talks and lectures made us all young scientist and we felt that we all have everything within us. Most importantly I was motivated to learn in this very institute. The lectures were not only adding knowledge but was making all of us good scientist even. Though all were professors who conversed with us we felt that they were our teachers as they conversed with us in a friendly manner and made the lectures more interesting by making us to interact with them. We also came to know many new facts which would make us lead a more prolific life.

We all are greatly indebted to Mr. Velaian, the organizer, Mr. Johnson, Mr. Edwin Sam, Mrs. Krishnakumari, Mrs. Rathika, Mrs. Jeyakumari, Dr. Umaesh Khadni and Prof. Ananth Kumar, Mr. Vibin, Mr. Rohit, Mr. Paragya, Mr. Subramanian, Miss. Akshya, Prof. Ramya, Dr. Saritha Vig and Prof. Dr. Chandrasekhar for their presence and support which made this a grand triumph.

**Pradheep Narayanan,
RED Team**

"The desire to fly is an idea handed down to us by our ancestors who...looked enviously on the birds soaring freely through space...on the infinite highway on the air"

-Wilbur Wright

We had another excursing episode of Young Scientist Programme held at Indian Institute of Space and Technology (IIST), a unit of Valiamala, Thiruvananthapuram on 23-01-2015. We got into the bus punctually at 06:45 am at Marthandam. With a lot of anticipation, I was equipped for this session. We reached IIST by nearly half past nine. The whole infrastructure of the college was much elegant and we were accomplished with lot of facilities also.

In this session, we were accompanied by Mr Velaian (Organizer of KAP), Mr Johnson, Mr Edwin Sam and other Guide Teachers. After entering the campus, firstly we had our breakfast in the canteen. Then we got seated in the Seminar Hall. There we met a prominent personality. It was Gby who campered the session. She stated the uniqueness of the University. IIST is a unit of Valiamala, located 18 km far from Thiruvananthapuram. It is the Asia's first space institute to offer special focus on space. It has a unique man-day of Engineering for young gleaming students. It is a World Class Educational Institute. It constitutes significantly to space endeavors. She welcomed all the dignitaries also. Then it was Dani Rovas who expressed the experience we have got from KAP.

Firstly, Prof Umesh Khadni gave his lecture. He said that we the Youngsters can learn more as the opportunities are increasing significantly. He also added that we must be very ambitious to reach the pinnacle in our life. He also emphasized the importance of Space technology that with the wide advancement of Technology in Space Research only, we are able to view everything in this world. It makes communication possible too. He stressed that Curiosity is the sign of life. He made us understand this with a fine personality Sachin Tendulkar. Sachin turned his complete interest towards Cricket. Whenever he sees boys playing cricket, he used to go and play. So because of curiosity to play cricket, now he is a worldwide eminent Cricket player. He said that this is the right age we have got to decide our ambitions and professions. He stated that if we take in deep aspects, exercise is bad because when we do exercise the essential calories stored in the joints get burned, but in order to make the body to earn itself, doctors suggest to do exercise. He deliberated that even a few people choose professions like a

tea tester who assigns grade for each quality of tea and there are people who have professions to find out a new odour to make perfumes out of that.

He emphasized that Education is something learning by watching the experts. Learning is not only limited to schools. Worldwide eminent personalities like Einstein, Thomas Alva Edison, Bill Gates, and Steve Jobs did not complete their graduate, but now they had emerged as inspiring role models. He said that horse never stands even while sleeping; likewise our mind should also be steady. Astronauts travel in space shuttles in spite of knowing it is a risky profession. He named a Scientist, Cecile who discovered Benzene, a hexagonal-shaped bonding structure of an atom when that idea rose in his dream. He added that we must ask questions to ourselves, if we can't solve it, we should refer books or ask experts. Science is a collection of facts and involves thinking. Everything is Science. Whatever we do, there is a science behind it. Even cooking and music are a complicated science. No matter what profession we practice, everything is formed by science. If science would have not existed, the nothing would have existed. He listed a few points to become an Expert Scientist

- Sharp eyes
- Sense of feel
- Sharp sense of hearing
- Curiosity
- Analytical ability
- Information

He also pointed that we, the Young Scientists are in a mission. Even wastes can be converted into useful products. If we visit rural people using woods for cooking purpose, we must analyze whether it is efficient or not, is there any alternative method or a substitute to it. So we must experience everything. Use of washing machine consumes surplus capacity of water and excess detergent is also discharged into the water bodies. He finally said that Scientist is not only one, who wears a white coat and use mechanized equipments in his laboratory, but they can be also be a ordinary man who eagerly attempts to become a scientist.

His speech was very informative and was stimulating to the youngsters.

Feedback of this session was given by Reshma. Then we had a short break.

Then another speech on Climate change as rendered by A Chandrasekhar, The H.O.D of Space Department. He asserted that Weather is the state of atmosphere at a particular time or a place. Wind, rain, clouds are some of the parameters to detect the climate of a region. Climate is the average weather condition over a long time of period or if the time scale is expanded, then it is said to be a climate. He reported that there is a difference between Climate Variability and Climate Change. Then he differentiated Climate and Weather by a famous saying:

"Climate is what you expect, but weather is what you get" - Mark Twain

Then he gave us the definition of the Proxy Climate Data. It is a report that delves into deep history of past climate variation through what are called Proxy records. Then he stressed the word Pale climatology. He deliberated the explanation of the term Green House Effect. He also told that any absorber of heat is a good radiator.

The phenomenon by which the earth's atmosphere traps or absorbs the solar radiations through the gases like Carbon dioxide, Methane, Water vapour, Nitrous Oxide etc is called Green House effect. These gases are said to be Green House gases. He stated that there are 30g of water vapour in 1 kg of gases, but CO₂ constitutes just 400mg among all the green house gases. So he pointed that Water Vapour is found abundant in this effect, but it's emission is not hazardous than CO₂ because water vapour gets converted into water in the process of Water Cycle and it's residency period in the atmosphere is just 3 to 6 days, but the residency period of CO₂ in the atmosphere is more than 1000 years. The Green House Effect was discovered by Jean Baptist Fourier. Increase in the level of green house gases in the atmosphere increases the global temperatures of the earth also and leads to Global warming. Then he mentioned the effects of Climatic change:

- Raise in sea level
- Surface Area of Temperature increases 0.6 degree Centigrade every year
- The ice of Arctic sea is melting
- Sea surface temperature is warming
- Drought is occurring
- Disrupting the distribution of heat
- Crops are withering

Finally, he said that we the humans are only contributing to the Climate change and persuaded us not to burn fuels and other substances. So adequate actions and technologies must be enhanced to prevent this condition.

Dani Rovas was called upon to give the feedback of the session. His speech was professorial and gave us a clear data on climate change.

Next was the speech delivered by Ms. Saritha, the faculty in Astronomy Department. She reported that the Study of Heavenly or celestial bodies is known as Astronomy. The study of Astronomy includes the study of stars, sun, galaxies, planets, asteroids, comets etc. She deliberated that generally, the distance between any celestial bodies is calculated on Light year or the distance travelled by light in a year. Then she also listed some of the units for calculating the distance which includes Astronomical unit and Light year unit. She asserted that the sun and other celestial bodies are gravitationally bound with 8 Planets, 166 known Moons and billions of smaller objects like Asteroids, Comets, and Meteoroids.

Then she made a comparison between a Terrestrial planet and a Jovian planet
Terrestrial planet (Inner planet)

- .Small in size and less in weight

- High density
- Solid surface
- Temperature is warmer
- Has only few moons and rings

Jovian Planets (Outer planet)

- Larger in size and more in weight
- Less density
- Not a solid surface
- Temperature is low
- More number of moons and rings

If a planet has existed, it must be:

- A body orbiting the sun that has enough mass to form a sphere
- Should not be a satellite of other objects
- Cleared its immediate neighborhood of smaller objects

She pointed that there is an astral belt between Jupiter and Saturn. She also told that comets are the icy objects made of carbon dioxide and methane, revolving around the sun in an elliptical orbit. If it comes closer to the sun, it gets sublimed. She told that there are 2 types of comets namely Long Period comet and Short Period Comet. In a long period comet, the arbitrary period is more than 200 years, while the arbitrary period of a short period comet is less than 200 years. Then we had a discussion on another topic- Sun. She stated that sun is an ultimate source of energy. It supports life. It makes photosynthesis possible. It makes the plants grow. It is the primary source of heat and light. She also added that the maximum amount of light from the sun is optical. Then we moved to other topic- Constellations. The group of stars is called a Constellation. The pattern of stars defines the Constellation. She named the brightest star in the sky named Alpha. Stars appear different colours due to the change in temperature level. There are 1021 in total in the universe. Finally she shared with us the First India's Satellite Astronomical Mission named Astrosat.

Her speech covered almost everything in Astronomy and made us understand a clear picture about it.

Next we had lunch in the canteen of the Institute. After having our lunch, we moved into the Lecture Hall. Ms Ramya articulated her views on Remote Sensing Satellite. Monitoring and Viewing photos anywhere in the world that can't be seen with naked eyes or without mechanized equipments. Remote sensing is possible only because of satellites. According to her statement we understood that the first image was captured by a Frenchman Nadar from a hot air balloon in 1820's. He took the photo using the camera which was placed on the kite. During the next generation, messenger bird was sent to send and receive messages. At the former generation, advancement in the field of technology in satellites found expression in space-based remote sensor.

She reported that the images in the remote sensor are formed through reflection. There is an electro magnetic spectrum placed inside these satellites. These are the well-designed satellites which can be used to view the objects in a city or in a particular place like cars, trees, buildings, sky scrappers, transportation lines etc from outer space. She added that if the sunlight is passed on a red-coloured object, then it gets reflected and appears in the colour of the same object as the output. But if the light falls on cyan-coloured objects (blue + green), it gets absorbed and will not be reflected and appears black in the output.

She also said that Digital Images are formed in the remote sensing satellites. After getting the clear view of the region, they analyze and go on accordingly. Then she completes her speech.

Feedback of this session was given by Abina. Her speech was very informative and made us to think out of box.

Then we went to Remote Sensing Lab with Ms Ramya. We had a glimpse over the Ariel view of Chennai sent from remote sensing satellite in the Envy Software system. We were able to see wide spectrum of colours representing trees, seashores, cars, water resources, agricultural field containing different colours to represent different varieties of crops in the given pixels. Then we worked in systems and had a view over the image of regions taken from the satellite.

Next we went to Earth and Science Lab. Mr Vibin and Rohit explained us briefly on the geological structures of the earth. Geology Science that studies about the formation of the earth. The word "Geology" is derived from Latin in which "Geo" means earth and "Logo" means Science. He pointed the 3 layers of the earth- Crust, Mantle and core. He stated that Inner core is actually solid because of the pressure accumulated on it, but the state of outer core is liquid. He also added that Seismograph is the instrument used to recognize the layers of the earth.

Then we went back to Seminar Hall. We planned and had a discussion on the next sessions and our commitments on that day. The ecstasy of the session finally came to a termination.

This session was really a fascinating one. Within a short period of time, we have learnt a lot of things. We also got a clear picture on the topics that were covered on that day. We were also introduced to several new creditable topics. Everything was prompt and we were provided with a lot of facilities too. I offer my sincere thanks to KAP for this opportunity. In fact, I am longing for another similar opportunity from KAP soon.

R.S.Raksha
Red Team

"SCIENCE IS AN ORGANISED KNOWLEDGE" is a famous proverb in which I have learnt. To have a basic knowledge on Sustainable Environment KAP organized a visit to IIST [Indian Institute Of Space and Technology] which is situated in Valiamala.

On 23/1/2015 around 6:30am we assembled in Kalachandhai bus stand we started our journey to Valiamala by 6:45am and we reached there by 9:45am. First we went to the canteen and we ate our breakfast which we bought from our home. Then we went to seminar hall and the compeering session was given to Gby of Green team.

At the beginning we met Mr.Umesh, Professor of IIST, then Dani of Maroon Team mentioned about KAP and its activity. Then Gby said a brief account of IIST, she told that this is the first institute of science and technology in Asia for space science. It is a economist body, it is situated in Valiamala 18km far from Trivandrum and it is in the way to a beautiful tourist spot Ponmodi and she told that Mr.Dhas Gupta is the Director of IIST and the Chancellor of this institute is Dr.APJ. Abdul Kalam.

Then Mr,Umesh started his address by welcoming every one. Astronomy, Remote sensing are some branches of IIST. If we stand in front of a crowd there will be people 5 years younger as well as older than us .If the people is 5 years older he will have more experience if he is 5 years younger he will be so active, an younger ones can learn more so he told us that this is the age for us to learn so we have to utilize this time and gain a better future. Then he told that Learning is not only for exams its for our life, next he told an interesting fact that "Exercise is not good for health" because exercise burns heart calorie so too much exercise leads to heart problems.

The next task, he asked us our aim and most of us in the hall told that, 60% doctors, 5% engineers and rest others. Then he asked us "Who all like to be a fingerprint expert, hair dresser etc ?" no one rose their hands up. Before that he told a job called Tea Tester this is meant to taste the tea and mark the tea according to its quality this is a very boring job. Then he told us that nowadays people choose job for interest, entertainment etc. Then he asked us" who all uses perfumes?" we answered then he told a very interesting fact that some people go around the world in search of unique perfumes, they even mix two or more chemicals to form new smell. Then he told that he had a friend in Delhi who was a classmate of Sachin Tendulkar his friend tells that "he is very fond of cricket as well as cricket bat" while coming to school while he sees some local children playing he also used to accompany them ,he will always have his bat with him even in exam hall".

Conservation of energy is also a profession. While showing the ppt he also included a slide with a picture that a daughter trying to walk like her father. Then showed some school or college dropouts such as Thomas Edison, Albert Einstien, Wright Brothers, Benjamin Franklin, Henry Ford, Walt Disney, Bill Gates, Larry Elison, Micheal Dell etc they didn't have proper learning but they tried there best to get a bright Future. Then he said that Learning is not limited to school.

He told that a good quality horse doesn't rest like the same our brain should be, an ice cream while we eat the first 3 spoons tastes the best but the rest will not taste much. Then he notified that while our mind is curious our mind will look around us, Science is not just solving mathematical problem. Cooking is one of the most complicated science. He added that while he was small boy his aim was to become a driver of a Road Roller because this work have expensive machines even silver lined fluorescent dress he advised us that a good scientist need open eyes, sharp ears, sense of taste, feel, sense of smell curiosity, analytical ability and collecting information. At the end he told that in India if a man see a sweeper see a man sweeping he says "poor" but in abroad the people who sees this thinks how can we lessesn the effort. At last he quoted "Science is every thing" and said I don't need scientist with coat and chemicals.

Then we had a break for 15 min. the snacks was been sponsored by the institution, it was delicious and then we assembled in the seminar hall again.

The next address was given by Mr. Chandra Shekar, the head of the department. He showed us a ppt about Climate Change. At the beginning he explained about weather as it is the atmospheric condition and climate as Average weather condition in a particular place for a long period of time. He described about Climate Variability that it is the variation in climate year to year.

He notified a superb quote that is "Climate is what you expect weather is what you get" said by Mark Twain. He made us know that Climate varies across the space and time.

He notified that the Earth is 4.5 Billion years old and the number of tree rings tells the age of the tree and the width of the ring gives the climatic condition of the particular place and this study is known as Dendroclimatology. He made us let know about Green House Effect, it is the increase in temperature ,CO-2, Methane, Nitrous oxide, Water vapour allow the radiation to and absorbs the Earth Radiation. Then he told a scientific fact that any good absorber is good radiator and he stated that water vapor is most abundant in Earth and Earth is getting more radiation because of green house gases. He then informed a fact that 1 drop of water remain for few days but 1 mol of carbon dioxide remain for 1000 years and even a degree can affect the Earth. By giving some information about climate change he concluded the session.

After some time a faculty in astronomy Miss. Saritha Vig was introduced to us. She showed us a ppt and gave a introduction to astronomy she described that

□ Light year= $3 \times 10^8 \text{m/s} \times 365 \times 24 \times 3600 \text{s}$

□ 1 Astronomical Unit= $1.5 \times 10^{11} \text{m}$

□ 1 Parsec= $3.086 \times 10^{16} \text{m}$

She told us an interesting fact that light will take 10000 years to travel from end to other end of the space.

□ 1 Earth mass= $5.97 \times 10^{24} \text{kg}$

□ 1 solar mass= $2.0 \times 10^{30} \text{kg}$

□ 1 Earth radium= $6.38 \times 10^6 \text{m}$

□ 1 Solar radius = $6.95 \times 10^8 \text{m}$

She also notified that there are 8 planets in the solar system and there are even asteroid, Kuiper belt etc in the space and there are 166 known moons and she also explained about Terrestrial, it means smaller size, higher density and solid surface and also about Jovian, larger planets, lower density and no solid surface.

She gave a brief account on what is dwarf Planets. It means that spherical .moving around the Sun and it should not be a satellite of any other planets. The examples are Pluto, Eris, Ceres, Make . She also said about comets , there are 2 types of comets long period, they live for more than 200 years and short period comets less than 200 years and Hally's comet survives for 76 years.

The next one about Kuiper belt, it is a belt with many small icy planet and found at the back of the planet. She also said that group of stars are known as constellation and the brightest star among all is Alpha and the Orion star consist of 88 galaxy, stars are the primary inhabitants of the universe.

She also explained about interstellar medium, it is the gas and dust between stars. There are 1010 galaxies - 1021 stars. And she told that there is a black hole in the middle of the Milky Way Galaxy. And she also included the future project which is in progress called Astrosat and it is the India's first Astronomy based satellite by telling this she concluded the session. Then Johnson sir said about the inaugural function of Vpro technologies. Then we left the hall and went to the canteen to have our lunch . We had a Kerala traditional food and then we assembled in lecture room, we had a good seating there and Mrs. Ramiya taught us a lesson about Remote sensing. She began her speech with the introduction of what is Remote sensing, which is the eye in space. And it means that going up to take a clear picture, satellites are basically known as eye in space then she notified a person from France known as Nadar. He used a hot air balloon to fly high and take a snap and this snap was the first photograph around 1827 and after some years they kept camera in a kite and took photo. This was also a famous photograph.

Then the next slide emphasized about Electromagnetic spectrum. She told that there are 24 satellites around the world. Then after some time we walked to remote sensing lab. There they showed us a map of Chennai city and asked us to calculate the area for agriculture etc and the software used for this field is Envi. And she told according to pixel clarity of image will be good. This is called high resolution image. We can also make map using remote sensing. The agricultural areas are denoted by red color, sea by black color. We can find the total area of agriculture can be easily taken by counting the pixels and multiplying with the size of 1 pixel. Then they gave us a paper and system to do practical. After that we left to the geological department. There we met ,Mr.Rohith ,Mr.Subu, Miss.Pragya and Mr.Vibin. They gave a clear picture of soil, the elements present in soil etc. They told that there will be gaseous exchange in soil mix with magma. In soil the elements having low weight comes up and vice versa. Then they explained the

formation of Earth. The Crust, Mantle and Core are the layers of Earth and they also gave lots of information. With the feedback and we concluded the session. Then we refreshed and ate snacks and returned to Kalachandhai bus stand it was a very big celebration while we returned back. It was an amazing day in my life.

**P.K. Raghul
Yellow Team**

"A country which is powerful in space technology remains the supreme power"

These lines indeed gave us a great idea about the necessity of space technology in modern world. The visit to the IIST (INDIAN INSTITUTE OF SPACE SCIENCE AND TECHNOLOGY) proved it right. After having our breakfast we assembled in a seminar hall where we were welcomed by Professor Umesh Khadni. Gby Atee, the leader of Green team, compeered the meeting. Dani Rovas gave ideas about the goals of KAP.

Then Gby Atee gave a short introduction about IIST.

It is the first college in India that deals entirely with space technology and was opened in January 27, 2007.

It is a part of the Valiamala unit.

Its vision is to create creative and unique students.

The current Chancellor of IIST is Dr. A.P.J. Abdul Kalam.

Then Prof. Umesh Khandi gave his talk. He appreciated KAP and the students for their devotion towards their work. He told that we should respect two people; One who is older than us by 5 years of age or younger than us by 5 years. He quoted "The more younger we are, the more we can learn". And he added that we decide our likes and dislikes by our understanding. People live in a world which is small and they should realize their potential and strive better. There are a lot of other interesting occupations including tea testers and perfume makers who were given much salary. Whatever job we practice we must do it with dedication. For eg; Sachin Tendulkar, the master blaster used to carry his bat wherever he goes. Then he gave a wonderful PowerPoint Presentation on Education. Education is defined as the process of receiving or giving systematic instructions. It is also said to be the science of teaching. We learn by watching our surroundings and others. Then he showed a picture depicting a child who does a similar action as his father. Some of the famous personalities who were very famous but were college or school dropouts are Thomas Alva Edison, Henry Ford, Albert Einstein, Walt Disney, Bill Gates, Mark Zuckerberg, Steve Jobs, etc. The sign of life is to become curious on watching something different. Be curious, Think, A good quality horse never sits. Similarly our thirst for knowledge should never die. He also mentioned some easy experiments to do at home. Then he explained the real concept of science. He told that science is everywhere. It is a collection of facts which connect the real life with text book. It is also testing ability to reason. The activities that we perform in

every aspect of life include science. Cooking and Singing are some of the complicated sciences. The only need of science is curiosity which helps to learn.

A good scientist possesses the following qualities;

Open eyes

Sharp ears

Curiosity

Analytical ability

Information

Feel

Sense of taste

Sense of smell, etc.,

All the above lines can be simplified as Observe and Inspect everything. He also told us to learn about refrigerators. He concluded by saying a few phrases such as be scientific and brave, ask questions and learn from surroundings. His speech was an encouraging one filled with determination to improve the knowledge of students to serve mankind. Reshma, the leader of maroon team gave the feedback.

Next we had a short tea break after which we assembled again. The next presentation was given by Professor Chandrashekar who is the head of the Earth Science Department. He spoke on " Climate Change ". Weather is the state of atmosphere on any given day in a specific place and climate refers to the average weather conditions for a long time. Mark Twain defined it as " Climate is what you expect and weather is what you get ". Then he related them with various cities in India. Climate can be also mentioned as climate variability and climate change. However the both are not same. Climate variability varies each year and climate change is an irreversible change done by pollution and other causes. To determine the average climate of a specific place we need the data of weather conditions in the place for at least 30 years. Earth was formed 4.5 billion years ago. The earlier climatic conditions can be found through Paleoclimatology and Detroclimatology. Climate change is caused by greenhouse gases. The warming of earth's surface due to the absorption of solar energy is greenhouse effect. Green house gases such as water vapour and carbon dioxide constitute to greenhouse effect. Water vapour accounts for 60% of the greenhouse effect. However carbon dioxide is said to be more dangerous than water vapour because water vapour live in clouds for a few days but carbon dioxide stay for nearly 1000 years. In 1950 it was 300 ppm but it has now increased to 400 ppm in 2013. Last 100 years there was a temperature rise of about 0.6 Celsius. This leads to various disorders like,

Melting of ice caps and submerging of low lying areas.

Plants will die due to the excess heat from the sun.

Heat is distributed by water and air through Thermohailane circulation and this change can result in disorder of heat distribution which causes the areas near to equator to cool down terribly.

Most of these factors are contributed by humans due to the burning of fossil fuels while some which are contributed by nature are volcanic eruptions, etc. The feedback was given by Dani Rovas of maroon team.

The next presentation was done by Dr. Saritha of the Astronomy Department. She defined astronomy as the study of heavenly objects. She then gave details about the scales used in astronomy.

The length scales used in astronomy are,

$$\text{Light year} = 3 \times 10^8 \text{ m/s}$$

$$\text{Astronomical unit} = 1.5 \times 10^{11} \text{ m.}$$

$$\text{Parsec unit} = 3.086 \times 10^{18} \text{ m.}$$

Other scales used are,

$$\text{Earth mass} = 5.97 \times 10^{24} \text{ Kg}$$

$$\text{Solar mass} = 2.0 \times 10^{30} \text{ Kg}$$

The size scales are measured according to the size of objects. And soon she explained all the components of solar system. It consists of 8 planets and its 166 moons, comets, asteroids, meteoroids, etc. the 8 planets can be classified as follows,

Terrestrial planets

Jovian planets

- | | |
|-------------------------------|-------------------------------|
| 1. Also called INNER PLANETS. | 1. Also called OUTER PLANETS. |
| 2. Small in size. | 2. Big in size. |
| 3. Structure is rocky. | 3. Made of icy objects |
| 4. Temperature is high. | 4. Temperature is very low. |
| 5. Higher density. | 5. Lower density. |

In 2006, the International Astronomy Conference was held where it was decided that only the first 8 heavenly objects were certified as Planets and Pluto was recognized as a dwarf planet. The definition of planets were defined in the conference and that is "Planets are spherical, moving objects around the sun and should have cleared its immediate neighbourhood. However Pluto have small icy objects floating around it and therefore called as a dwarf planet. Now there are five planets recognized by the international astronomy union. There are also other small objects floating in space which include the asteroids originating in the asteroid belt and comets made of methane, carbon dioxide and ice. Comets move in long elliptical orbits. Long period comets take more than 200 years to come while short period comets take less than 200 years (Halley comet). Comets originate in the Kuiper belt.

The sun is the centre of our solar system. Its surface temperature is about 5500 Celsius. It is a G type of star. Solar flares appear in sun. Sun is not uniform all over the surface. Optical rays are more from the sun compared to ultraviolet rays and infrared

rays. Even sun is a star. Billions of stars are found in the universe. A group of stars form a constellation. Till now 88 constellations are found and the famous among them is Orion which looks like a hunter. The brightest star in a constellation is called as Alpha. Stars can be classified into various types depending on their brightness and heat. They are,

TYPE	COLOUR
O	Blue
B	Blue
A	Blue
F	Blue
G	White or yellow
H	Orange or red
M	Red

Interstellar medium is the distance between stars and is covered by gas and dust between them. Hydrogen in stars cover 70% of universe and helium cover 24% of universe. Milky way (Spiral in shape) has 10^{11} stars and universe contain 10^{10} stars. Also every galaxy has a black hole which sucks the nearby objects and grow bigger.

Finally she concluded her speech by giving information about the satellite "Astrosat", a specially designed satellite. It has X-ray telescopes and UV-ray telescopes which will aid us better in understanding the solar system. She also informed that there are telescopes with lens of radius 4 inch and 14 inch. Then she cleared all our doubts and made as crystal clear about astronomy. Sabrina presented the feedback about her speech. Then we went off to have lunch.

Soon we assembled again in the lecture hall at 2.10 pm. Professor Ramya gave a Power Point presentation and explained about "Eyes in space" which actually means Satellites. The idea of capturing photos in an aerial view was started by Mr. Nadar in France in 1800. He captured images from the top of the hot air balloon. Then people fixed camera to kites. Similarly they took photos by tying the cameras to the bird's leg. A good aerial view photo was taken by the Wright brothers from the Aero plane that they invented. This idea soon transformed into the idea of taking photos from space resulting in the invention of satellites. The basic concept of remote sensing is reflectance and finding the amount of particular object. This works on the principle of electromagnetic spectrum. When white light falls on a red surface, red colour can be seen because green and blue are absorbed and red is reflected by the surface. Remote sensing satellites send waves on the earth and measure the energy that is reflected. This helps to find the object and the amount of them available. Satellites take digital images and make us to identify the amount of resources available and also to study different landforms. Then Sree Meera asked a doubt about Global Positioning system which she answered clearly. Soon Abina, the leader of red team gave the feedback.

Then we went to the remote sensing lab where we were guided by Professor Ramya and Professor Divya. We were given instructions on how to view satellite images and we feel like scientists ourselves. It was a marvelous experience. Then we went to the Earth and science lab where we were accompanied by Mr. Bibin, Mr. Rohit, Mrs. Praghya, Mrs. Akshaya and Mr. Subramaniam. Mr. Bibin gave a lot of details and defined Geology as earth science and as the science dealing with the formation of Earth. The earth is divided into various layers - Crust, Mantle, Outer core and Inner core. Inner core is in solid state and outer core is in liquid state. Radioactive elements are present in the core and therefore it is too hot. Seismograph helps in finding the structure of earth. There are two waves namely Primary wave and Secondary wave. Primary wave can travel through any surface but secondary wave discontinues once it reaches a stop. Soon we departed from IIST. We were also informed about the next meeting which is a technical Power Point presentation. The time duration is 5 minutes and we should present 5 slides. We should include inventor, its uses and its working principles with diagrams.

The meeting was entirely different one from our previous meetings. We have gained enough knowledge about astronomy and space. We also came to know about climate change which is a serious issue concerning the Earth in the 21st century.

**ABINA.S
RED TEAM.**

On a 23/1/2015 the program for young scientist was conducted at IIST at Valiamala. Our journey started by 7:am in the morning and we all assembled at Marthandam bus stop by 6:40 at morning. We all got into the bus arranged for us. It was an Air bus. We all sat on the comfortable seats and started our pleasant journey. On the way to our destination, We had a good surrounding, we refreshed ourselves by watching a movie and talking to our friends. After a travel of 2 hours we reached there by 9:am and had our breakfast at the mess and assembled at the seminar hall by 9:30 am. This meeting was compered by Gby Atee the leader of Green Team.

First Gby introduced the eminent personalities of this meeting. Then she invited Dani to give a short report on the functions of KAP. She said that KAP is giving as lot of opportunities. It gives us new way to show our talents. Some of the assigned jobs are like newspaper cuttings and recordings, writing of reports, feedback sessions and writing thanks letters. Some pointing out some functions she stopped her words.

Next Gby Atee said about the institution. She said that this institution is first in Asia to give knowledge on Space and technology. This institute has its own and unique feature. Here they make engineers and scientists. The vision of this institute is to be the world class institution. By these words she concluded her speech. She also mentioned the

topics we are going on to discuss today. Then she invited Dr. Umesh to share his words with us.

Dr. Umesh he welcomed all of us. Then started his scientific talk. He said that we are at IIST. Here they make engineers and scientist. They learn about the space technology and do research on satellite data. Astronomy and remote sensing are other important topics here. There are two kinds of people, one of such is people 3 years older and the second kind is 5 years younger. As we are young we can take up everything easily in a better way and understand faster. We learn most of the basics in the 1st year of our life. Then he entered into the topic of learning. He said that learning is not to pass in exams. When we learn something we really exercise. Exercise we mean is which helps in breakdown of food. Doctor's says as to exercise to make our body learn something. Exercise is needed mainly to our brain. He also made our discussion more interactive by asking some profession and pointing out our aim to have a particular profession. Some jobs we choose are intelligent and some are entertainable. He also narrated a meaning full story on the work of a tea tester and a mango seller. He also said as a real story of Sachin Tendulkar that one of the class mate of Sachin is the friend of Prof. Umesh. So he said that Sachin used to carry cricket bat wherever he goes even to exam halls. If he sees any one playing in the street or anywhere else he used to go and play with them. But his parents didn't wanted him to play with anyone else and gave him good coaching. So this was a story which touched our hearts and made us to set our goals properly and work hard for it. Nature conservation is also a good profession. A very good educational institution is IIST. Then he also showed as an image of a child doing like her father on a street. It was the image which raised lots of thoughts and questions in our mind as this picture didn't have any influence with our subject. Education is something which we learn from others and the surrounding was the meaning behind that single picture. He showed a list of drop outs in schools and college's and became success in their life. The list was:

- Albert Einstein
- Wright Brothers
- Benjamin Franklin
- Harry Hudini
- Henry Tord
- Walt Disney
- Bill Gates
- Larry Edison
- Michael Dell
- Paul Allen and
- Steve Jobs

Then he showed the image of Kalpana Chawla. He said that she went into the space due to her curiosity. CURIOSITY IS VERY IMPORTANT. We all have and must have curiosity. Our mind must be alive always. A good quality horse will never sit even during

sleeping. Kakule was the man who became scientist by finding something which he saw in a dream. Curiosity can do whatever we can and can't. When we eat ice cream for 2-3 spoon the ice cream will have taste and then we feel like we it doesn't have a taste but drink warm water after that again the ice cream tastes. An elder person can ask doubt to anyone but if a child asks to anyone the person will be more interested to explain than a man asks. Science is a collection of facts and not by solving problems. Science is basically thinking power. Cooking is one of the most complicated science. For example, If we eat sambar and rice only it tastes different the same way if we eat sambar , rice and pupate it tastes different. First the aim of Prof. Umesh was to became the driver of a coal tar machine. The jacket worn by the workers there has a silver lining and he said its importance that the lines indicate that here work is going on and people are present. Singing also has a great science. There is even science in painting. A sweeper sweeps the floor it also has some basic science in it. He also said about the difference between the foreign society and Indian society. To be a good scientist he said some the formulas they are:

- Open Eyes
- Sharp Ears
- Sense of taste
- Feel
- Sense of smell
- Curiosity
- Analytical ability
- Information

We all must have a vision. we are here with a particular vision. We must follow and do new methods which can influence people. We should share something with others. Our vision can come true when we work it forever. We must always be a scientist. For example, if we take the uses of Washing machine as the subject there advantages as well as disadvantages. We scientist should think how to have both the things as advantage. IF WE LEARN FROM THE SURROUNDING THEN WE ARE SCIENTIST. Finally he wished all of us to become great scientist in the coming world.

For this talk the feedback and vote of thanks was given by Reshma of maroon team. Then we had a break and we were provided with crunchy snacks and a cup of tea.

Then by 11:25 am we were invited to lend our ears to hear from Prof. A. Chandra Sekar. The topic he had discussed was about Climatic Change. He started his speech by the geographical condition. Weather is the state of atmosphere. Climate is the particular state of weather for a long time in a particular place. Climate variability and climate change are not common. Climate variations are known as climate variability and climate change means changes caused to climate due to some factors(example: Global Warming). Climate change is always in one direction. Climate is the average of Weather. "Climate is what you expect; weather is what you get". -Mark Twain.

Climate varies across space and time. 30 years average climate for a city or region. Pale climatology is one of the proxy climate data. 4.5 billion is the age of the earth. Width of the rings in the trees can find the climate in the past as the tree grew and this study is called as dendro climatology. Our fore fathers have written about the climate also Galileo found the thermometer before 300 years. Green house means Glass house. If we grow a plant covering with a glass container it does not allow the heat to escape. Water vapor is present in 0.30% and it is the most abundant one present in the atmosphere. 400 milli gram of CO₂ is present. Green house gas allows the incoming radiation to penetrate and absorbs the earth's radiation. 4 micro meter is the radiation from the sun. The radiation from the sun consist of :

Visible= 50%

Infrared=40%

Ultraviolet=10%-rays.

Earth radiates from 4 micrometer - 100 micrometer. A good absorber is a good radiator. It will radiate both upward and down ward. The earth gets more radiation from the green house gas. The property for global warming is that a water vapor in atmosphere will remain for few days, but a CO₂ molecule remains in the atmosphere for 100 years. The residency time is more in Co₂. PPM= Parts Per Million. PPB= Parts Per Billion. 1Kg of air= $500 * 10^{-9}$. Methane and carbon dioxide are the dangerous gas to the atmosphere. Scientists say that during past 100 years the temperature of air increased an average of 0.6 Celsius (1.10 F). The effects of climatic changes are:

Melting of Glaciers and ice

Sea surface temperature is warming.

The amount of radiation from the sun is more and amount of radiation from earth is less. In equatorial region this factor happens but in the poles this factor happens in a opposite manner and inversely proportional to the equatorial regions.

Poles temperature is very cold so density of water is higher and it sinks. They then go to lower latitudes and equator and surface of warm water is taken.

Melted ice becomes water. Thermo Hylin circulation cycle take 1000 years. If this happen in poles the poles will become extremely colder and equator warmer. Crops are withering due to high temperature. He showed some graphs as observation of global average temperature. Anomalies is departure of last 10 years. Global warming is caused by natural causes like Volcano eruption, Solar disadvantage. These were the thoughts covered by him on the topic CLIMATE CHANGE. The feedback for this speech was given by Dani Rovas of Maroon Team.

Then it was our time to hear the astronomical words of Dr. Saritha Vig on the topic Astronomy with the help of a power point presentation. She started her speech with definition. Astronomy is the study of heavenly bodies.

Scales was the first topic she pointed of the scales were:

1ly= $3*10^8$ m/s= $9.5*10^5$ m.

1 Astronomical unit = 1.5×10^{11} m.

1 Parsec = 3.086×10^{16} m.

Galaxies = 1020m in terms of 1ly = 104.

Mass or size:

1 Earth mass = 5.97×10^{24} kg.

1 solar mass = 2.0×10^{30} kg

1 Earth Radius = 6.38×10^6 m

1 solar radius = 6.95×10^8 m

Sirius is the brightest star in the sky. There is large variations in the size of scales. Then about solar system. The solar system consist of 8 planets, dwarf planets, moon, meteoroids, comets etc.....

The comparison between two types of planets are: The two type of planets are Inner planets and outer planets. The inner planets are terrestrial planets and the outer planets are Jovian planets. There are four inner planets and four outer planets. The planet Pluto was considered as dwarf planet in 2006. The characteristics of a planet is said to be as follows:

Should be in spherical in shape.

Should only circle the sun.

Should have good neighbors.

The characteristics of a dwarf planet are:

Massive enough to be spherical.

The above mentioned is due to its gravity and not by its own.

Small solar system bodies consist of Asteroids, Comets, meteors etc..... The asteroid belt is situated between the planets Jupiter and Mars. The asteroid Mathilde is 59 Km. Comets are ice objects made of gas and ice. There are two types of comets long period comet and short period comet. Halley's comet comes once in 76 year. Kuiper belt is a constituent of icy objects.

Then to the big subject Sun. Sun only helps in the support of life in earth as it is the main source. From our eye the sun seems to be in a uniform one. But there are flares which cannot be viewed by our eye. Each Flare is 3100 km long. Then we went on with the topic Dispersion of light. In the dispersion of light we are able to see only seven colors splitting but during this dispersion UV light and Infrared light is also present. Group of stars form a constellation. One of the constellation is ORION constellation. Alpha is the brightest star in the orion constellation. Colors of stars. Betelgeuse star is in Reddish color and Rigel star is in Bluish color. There are different colors due to the change in surface temperature of the star. O star is the massive star. 5,800 Kelvin is the surface temperature of sun. 25,000 Kelvin is the surface temperature of O star. The O star gives 1 million light more than that of the sun's light. Stars are the primary inhabitants of the universe. The Milky Way consists of 1011 stars. Cluster of galaxy means group of galaxies. In the universe there are approximately 1010 galaxies and 1021 stars.

Hydrogen is the major gas in the universe as it is 70% present in the universe. The space between the stars are made of Gas and Dust particle. Milky Way Galaxy is the Spiral shape galaxy. And finally she concluded her speech by saying that Our ISRO is going to sent a Satellite Named AETERO sat from India. It is going to be the first astronomy satellite and she showed as the graphical image of the satellite. By this she concluded her mesmerizing words. She also gave us time to interact with her and ask questions. Few students also asked questions and she gave as a brief explanation for our questions. Feed back was given by Sabrina from red team.

Then Mr. Johnson said us about the next program. After this it was our lunch break we all were called on to a mess inside the campus. Here we were provided with good, healthy and hygienic food.

After this around 2:25 pm we all assembled at the lecture hall. Prof. Ramiya guided as there. Here we were going on to discuss about remote sensing. She presented this topic as EYE ON SPACE in the form of PPT. She said that Eye on space means remote sensing. Remote sensing is something which helps us to see things which cannot be viewed by our naked eye. Satellites are the eye of us in Space. Satellites take images and we analyze such images. In 1800 Nadar from France after the invention of camera he flew in hot air balloon. In 1827 he took a photo from Air balloon. Then they fixed camera in kite, in birds and Wright brothers fixed camera in the aero plane and even they fixed in rockets. Basic concept of remote sensing is reflectants. She showed as a diagram of electromagnetic spectrum. White light is composed of all colors. A white light falls on the red car and the red light gets reflected and enters our eyes and we are able to see the color. Cyan (Blue + Green) color absorbs the light. In magenta color if green and blue light falls blue light is reflected back. In a graph only some portion can be marked as viewed portion. Satellites consist of cameras which can cover and capture all the area we are not able to see. In a satellite we will be having sensors based on the colors. These were the points said by her. We really got a base for remote sensing from this session. Here the feedback was given by me Abina.

Then we all went to the remote sensing lab. Here we were guided by Prof. Ramiya and Prof. Divya. Here we were separated into two group and each group was taught by two teachers. They showed as a satellite image of Chennai and taught us how to analyse the particular image, How to categorize, How to count the pixels, How to find the latitude and longitude of the particular place and some more. The software they use to do this function is ENVI. Images showing buildings are high resolution images. There are three sensors in this software they are:

Layer:1

Layer:2

Layer:3

The image can be classified by different colors. The area of the particular place from the satellite image can be classified by counting the pixels and multiplying by the space

resolution. The pixels can be automatically classified by the computer. Then we were allowed to sit in groups of two to three members and each of us did it practically with the help of a guide sheet given by them. By this the session in Lab finished and the Feedback was given By Abina.

Then we moved on to the geology lab and here we were guided by Vibin, Rohith, Vipiya, Trakeya, Acshaya and Subu. They said that Geology is the study of formation of earth and other planets. Geo= Earth, Log=Science. The earth consist of Crust, Mantle and core. The core is not Entirely Liquid. The inner core is solid and the outer core is liquid. Waves are of two types namely primary waves and secondary waves. P waves can pass through any medium but s waves are not continuous and can't pass through all the medium. Due to shortage of time we spent a very little time at Geology lab. Here the feedback was given by Edin Jijo of Yellow team. By this our session got over. We had a tea and then said them a thanks and stepped out of IIST by 4:20 and started our journey back to home. We had a short discussion in the van within our KAP group about the next program. All of us were admiring the nature and we danced, sung, cracked jokes and did more funny and enjoyable things in the bus. We all enjoyed a lot. This was a happy occasion that KAP wanted to frame a remembrance in all the minds as that was the enjoyable moment in KAP. KAP has given as such a chance to go to such a world class institution like IIST. This will be in the minds of us. Going there as a student is different than going as a 8th grade student of KAP. No one have given me or can give us such a chance to go to such a place. Thanks a lot to KAP and its members who helped in this programs success. Hats of to KAP!

Srinidhi N
Green team

"For I dipped into the Future, far as human eye could see;
saw the vision of the world, and all the wonder that would be."
-Alfred Lord Tennyson

Since the selection process, KAP has given us exposure in various fields to increase our scientific temper and knowledge. The session at the Indian Institute of Space science and Technology (IIST) on 23-01-2015 was one such remarkable experience filled with the talks and the explanations of eminent personalities who were well-versed in the field of Space science.

With a lot of disquietude and inquisitiveness, we entered at IIST, Thiruvananthapuram accompanied by the prominent members of KAP like Mr. Velaian (Organizer, KAP), Mr. Johnson, and Mr. Edwin Sam. The compeering was done by Miss. Gby Atee, leader green team. She welcomed Dani Rovas, co leader, maroon team to deliver a speech on the activities and tasks of KAP. Her speech included that a prior opportunity is given by KAP to develop the scientific amplitude. Then, Gby conveyed us the significance of IIST. She reported that it is Asia's first space institute ever. It is

accomplished with a lot of facilities for the young talents all over India. She even mentioned the distinguished faculties whom we were going to meet that day.

At first, she cordially welcomed Prof. Umesh Khadni who executed a presentation on Education. He intentionally deliberated that the main aim of them is to make us understand the basic concept of space science and technology. He said that he will voluntarily go to schools and colleges to present such seminars. He mentioned that the term learning does not only imply passing the examinations at schools. We just had a discussion of our ambitions in our future. Then, he noted the fact that we decide our likes and dislikes without even knowing the definition of such ambition. We came across a new term named Tea taster. He described that a tea taster is a person who assigns grade for each quality of tea and even there are people who have their profession to search for a new odor to make perfumes out of that. He narrated a short story of Sachin Tendulkar which was very much stimulating. He demonstrated a picture representing a baby who is following the walking style of her father. This is what he mentioned as learning. He reckoned that learning comes from experience. He listed some of the noteworthy personalities such as Thomas Edison, Walt Disney, etc... who were school or college dropouts and they became the remarkable persons in this world only by improving their knowledge by learning from their surroundings. He pointed another incident of Kalpana Chawla that she and her group even after knowing that their profession is risky attempted to travel in a space shuttle wherein she died.

Curiosity is another important factor that improves our knowledge. He remarked the fact that the taste of an ice cream decreases after 2 or 3 licks. But when we drink a little amount of warm water, again it will taste good. He said that the science behind the diseases will find a medicine for it. He also explained the science behind a road-roller. Cooking is a very complicated science. Our country is not developing gradually. For instance, a man in foreign noticed that the broomstick is made of a natural substance thus affecting trees. Some of the good qualities that he mentioned a good scientist requires are:

- Opened eyes
- Sharp ears
- Sense of taste
- Sense of smell
- Curiosity

He persuaded us to suggest the people of rural areas to use alternatives for domestic fuel. He concluded his speech saying that we have to be scientific in all the aspects of our life. The feedback of his hypnotizing talk was delivered by Miss. Reshma, leader, maroon team

The next rhetorical speech was given by Dr. Chandrasekhar, Registrar and HOD of space science on the major concern today, Climate Change. He defined climate change as the state or condition of atmospheric air. The average weather conditions for a long

period of time is said to be climate. He also said that the clothing is determined by the climate of a region. He asserted that the climate change cannot be predicted or determined easily. He added that a climate change is an irreversible process caused by Global Warming. He also quoted the famous words of Mark Twain: "Climate is what you expect; weather is what you get"

He then explained a term named Paleoclimatology that looks into the deep history of the past climate through "Proxy records". He enumerated that the climate of a period can be determined by analyzing the width of the rings in the bars of a tree. He then said about Green house effect. Certain gases namely Green Houses gases absorbs the radiated heat from the sun and retains on the surface of the earth. Thus, increasing the global temperature of the earth and contributing to Global warming gradually. The principle behind this is that any good absorber is a good reactor. Then the Professor raised a question that the air comprises water vapour in abundance when compared to Carbon Dioxide, but why CO₂ is considered to be the most effective green house gas. The answer is that CO₂ is capable to stay in the atmospheric air for at least 1000 years whereas water vapour can just stay for 5-6 days.

Then he listed some of the issues under Global Warming some of which are:

- Arctic sea ice is melting
- In general, the circulation of the atmosphere and the ocean distributes the heat from the parts near equator to the polar regions, but due to Global warming, the sea ice melts, thus destructing the distribution of heat
- Crops are withering due to the high temperature
- The quantity of the green house gases are increasing when compared to the past

The major issue today is that the major factors contributing to global Warming are human activities. The feedback of his explicit speech was given by Dani Rovas, co leader, maroon team.

Thirdly, a speech on Astronomy was expounded by Miss. Saritha Wig who gave a clear idea about the size of the celestial objects in the outer space. At first, she mentioned about Astronomy as the study of heavenly bodies. The unit to measure such objects is light years, Astronomical unit, and Parsec. Then we had a discussion about the solar system and the brightness of the sun. She informed that the Sirius is the brightest star in the night sky. She added that at first we had 9 planets and as of now we just have 8 planets. The 8 planets are of 2 types: Terrestrial (first 4) and Jovial (second 4). The difference between them is:

Terrestrial planets:

- They are the first four inner planets
- They are small in size and mass
- They have a high density
- They are warmer
- They have only few moons and rings

Jovian Planets:

- They are the last four outer planets
- They are huge in size and mass
- They have a low density
- They are cooler
- They have more moons and rings

There raised a confusion between planets and dwarf planets. There was a comparison between the sizes of various objects in space. Those include mercury, Jupiter, Sun, Sirius, and other stars in the space. The characteristics of a planet are:

- A body orbiting the sun
- Spherical in shape
- Should not be a satellite of other objects
- Cleared its immediate neighborhood of smaller objects.

Some such objects include comets which are icy objects comprised of carbon dioxide, methane revolving around the sun in a long elliptical orbit. At times, if these comets come close to the sun, they go under the process of sublimation and they melt. Even asteroids when coming closer to the earth, blast due to the friction near the earth and gets heated up.

The sun is the ultimate source of light and energy in our space. UV rays come out of that. A full spectrum of electromagnetic radiation is present in UV rays. Next, she defined a constellation. In general, the constellation is said to be a group of stars. The pattern of arrangement defines the constellation. The brightest star out of the constellation is known as Alpha. Some of the information which she stressed include:

- The surface temperature of the sun is 5500` C.
- The temperature, average radius, average luminosity determines the color of the star.
- The Milky Way galaxy has 10^{11} stars and the universe has 10^{10} galaxies, 10^{21} stars.
- The major gases in the universe include Hydrogen (70%) and Helium (24%).

She also informed us about the recent news that India is going to launch ASTROSAT which is India's first astronomy satellite.

Her speech was filled with a lot of facts which improved our knowledge in Astronomy. Then, Sabrina from red team came to the podium to give the feedback of the speech.

Then, we had our lunch at the canteen of the college and came back to a lecture hall where we were seated to listen to the presentation of Prof. Ramya, who even took us to the remote sensing lab and explained about all the systems in it, free of any ambiguity.

In the lecture hall, Prof. Ramya presented a seminar on remote sensing. She explained it in a detailed manner. At first, she said about Nadar, a person from France

who tried to take photos of France at the beginning of the usage of a camera in the year 1820. His first attempt was to have the view of France by travelling in a hot air balloon and capturing the photos of France. Subsequently, he used airplanes to take photos of France and then, rockets were used. These images are taken by principle of reflectance. Then, we had discussion on the color of the image. She said it with an example that the red color of a red colored car absorbs blue and green colors from the white light and reflects the red color. Like the same, if the cyan color is passed to a red surface does not reflect any light since the available light are absorbed by the red color. So a black color is seen instead of the reflected ray.

She explained in detail about how the satellite will take images of the earth. The satellite comprises sensors that take images which are even invisible to the naked eye. The satellite communication and the remote sensing are more helpful in television broadcasting. The size used to measure these images is pixel. The feedback of the session was given by Abina, leader, Red team.

Then, we moved to the remote sensing lab where Prof. Ramya shared her rhetorical thoughts with us on rocket sensing. We were divided into 2 groups and followed Prof. Ramya who said that the remote sensing can be done in the computers using Envi software which shows the available place in a map that and this image is taken from the satellite from the outer space through remote sensing. We were asked to find a place in India namely, Chennai. We were able to have an Ariel view of the rivers, seas, agricultural lands, buildings, trees, etc. She informed us the way of calculating the actual size of the area. The no of pixels $\times 5.8 \times 5.8$ gives us the actual size of an area. We were allowed to move to respective servers and we started to look for the various places marked with different colors in the map.

We then made our way to the Geology lab wherein Mr. Vipin, Mr. Rohit and Miss. Pragma gave a short and informative introduction to Geology. We noticed several type of rock there. Science that deals with the formation of rocks is said to be Geology. Mr. Vipin noted the point that the core is of two types: inner core, outer core. But the inner core is solid in state. This is due to the fact that due to the pressure of the upper lying layers, the inner core could not even find space to melt. We can get nuclear particles such as uranium from the core. We have an instrument named as seismograph to measure the distance of the earth's interior from the top. It comprises two types of waves: primary and Secondary. Mr. Edin Jijo of yellow team gave the feedback of their explanation.

Subsequently, we came to the end of the day. It was yet another rare opportunity in the young scientists programme sharpens our knowledge base on space science. This was all the more special because we had a direct exposure to aerospace science and technology through eminent scientists and professors of IIST at Thiruvananthapuram.

We cherished having acquired insight into the modern science which we could not have got through open space literature. I look forward to the next episode in our sojourn through science.

**S.DANI ROVAS
MAROON TEAM**

The only planet in our solar system with all the facilities to sustain life is our universe. We greedy humans are just spoiling these facilities and are destroying its sustainability. It is always necessary to keep an eye on our planet itself so that steps can be undergone in order to bring back the sustainability of our Mother Earth. This is the reason scientists are sending satellites and monitor our planet. Only the skilled are aware of this but not the locals and the children. KAP is always out of the ordinary in its path and so to keep the Young Scientists conscious of Satellite technology an astonishing and atypical meeting to Indian Institute of Space Science Technology on 23rd of January, 2015. This is a few and far between opportunity that we were blessed with and this meeting gave all us a different savoir faire that fed us with the basic knowledge on Space Science.

Gby Atee, leader of Green Team, anchored the session. Gby acknowledged the attendance of prominent personalities among us. Then I gave a brief talk on KAP and its activities which was continued by Gby with a succinct talk on IIIST that gave a unambiguous notion about it. She then welcomed Dr.Umash Kathney, an distinguished personality, to address us.

Children of today are the leaders of tomorrow. Future India is in the hands of Young Children. To develop India the important task for the children is to understand the space technology to make life better. We ought to have reverence for people who are at least 5 years elder than us as they have more experiences and at the same time for people who are at least 5 years younger than us as they are so active and have the courage to do anything in their life. Our human body is blessed with priceless body parts. When we don't utilize them for long they lose their ability to do refurbish themselves. This principle applies even to our brain. The superlative technique to keep brain toil and keep up its competence to renovate is through the itinerary of continuous learning. This is why Thiruvalluvar quoted the significance of learning as the paramount and supreme treasure in the world.

All of us do have role models whose moral fibers are imbibed by us in our life path. In general all the prominent celebrities have the character of doing what they are fond of. This is also dreadfully significant because we decide our likings according to our understandings in it; we involve heart and soul in activities understood by us; heartily involvement only bring out the best out of us; only the finest shows others the real us.

The most apt example for this is Sachin Tendulkar. When Sachin was young he loved cricket very much that he carried a cricket bat with him always. The hidden reason this was that he was impressed by this sport and he had ignited the splint of playing cricket. So always give preference to what you like to do also.

'fz;lijf; fw;fg; gz;bjdthd;' is a famous saying in Tamil. We should learn from our surroundings and from others like Albert Einstein, Thomas Alva Edison, Bill Gates and so on. Do not be book-worms because learning is not only limited to schools and colleges. It continues where ever you go. Children imitate the characters of the elders and their parents as a part of their learning. Learning is similar to sky that has no end. There is not a single man in this world with the knowledge of all fields. So keep learning.

'Curiosity is all about life in all of its aspects, it is still the secret of great creative people' said Leo Burnett. Kalpana Chawla, the first woman in space, took the risk flying in space shuttle only because of her curiosity in doing the risk. This is also the reason behind the existence of her name on Earth even after her death. Curiosity is the sign of life because only curious mind thinks. Only when we think our mind stays alive. Always be active like a horse. This is because the horse stands even when it sleeps. Curious minds develop questions and try the level best to answer those too. You need not have special talents but be passionately curious. There will be no force in this world that can defeat you.

Science is not only a collection of facts, it is based on thinking. Only when Science is understood it helps find the reason behind the functioning of each activity. Science is everywhere. You can achieve any profession if you are scientific. To be scientific you need to have observation skills and a different vision. A person without observation is like a person without wings. Similarly Leaders do not do different works but do works differently. If you can develop these skills you are a good scientist from then on.

To be good scientists:

- analyze things scientifically
- open your eyes
- have sharp ears
- develop a sense of taste
- feel everything around
- curiosity
- analytical ability
- be informatic

The key message that he conveyed was 'Learn from surroundings and be curious in all things'. With this he concluded his talk. His talk really made me curious in learning many new things. I am really grateful to him for such a wonderful presentation. Reshma gave the feedback of his talk and he was gifted with a book as a memento.

Prof.A.Chandrasekar showed an informative powerpoint on 'Climate Change'. He gave a clear-cut idea on climate change, causes of climate change and effects of climate change

with many statistics. He explained the reason behind each and every process also. This made the session enlightening.

Weather : It is the state of atmosphere on any given day in a specified place. It depends on temperature, pressure, direction of wind and the force of wind.

Eg : We need to have a cap today as they day is sunny. It is better to carry a raincoat as there is a prediction of raining today.

Climate : It is the average weather condition over a long period of time. Whenever the timescale of weather is expanded it gives the climate of a particular region.

Eg : Tamil Nadu experiences hot climate in the month of May and April. Ooty has got cold climate almost throughout the year.

Climate Variability : Variations in a particular climate year by year is called as climate variability.

Eg : The summer of this year is hooter than of last year. Last winter was severe than this.

Climate Change : Change in climate mainly due to global warming.

To know that the climate has changed we use Proxy Climate Data. It can also be scrutinized by the analysis of tree rings and pollen fossils.

Global Warming : Mark Twain said, 'Climate is what you expect, weather is what you get'. These words are not being followed these days as the climate is changing due to various factors.

Greenhouse Effect and Greenhouse Gas : The increase in the amount of CO_2 in the atmosphere increases the temperature of the Earth because it allows the UV rays from the sun to penetrate through them and traps them. Good Absorbers are good Radiators. Since the greenhouse gas has the ability to trap the ray it too has the ability to radiate them. So, the UV from the sun and the radiated UV from the gas contributes to the increase in temperature.

There are many greenhouse gases in the atmosphere like CO_2 , water vapor, CH_4 . There is a fact that the most greenhouse gas in the atmosphere is Water vapor. This fact is also been proved. Though water vapor is in large quantity, CO_2 is the largest contributor to global warming. This is because CO_2 stays in the atmosphere for long period of time nearly 1000 years whereas water vapor stays only for the maximum of 5 days. Methane too contributes more than water vapor but less than CO_2 because it stays in atmosphere for a few months. The increasing residential power of the greenhouse gases is the main factor increasing the global warming.

Global Warming effect today : The world's surface air temperature has increased at an average of $0.60C$. The amount of CO_2 in atmosphere is also increasing drastically these days. The global average temperature has increased from $0.10C$ to $0.30C$ from the year 1900.

Effect

warming of sea surface

melting of ice in polar region

regions near equator gets warmed

withering of crops on land without the capacity to withstand the temperature
affects water and distribution

Water Distribution : The ice in the higher latitudes sink due to higher densities and move towards the low latitudes whereas the warm water move towards the high latitudes from the low latitudes thus maintaining the water level. The devastation of this distribution due to global warming is increasing the water level.

Causes of Global warming

burning

smoke from vehicles

smoke from factories

I gave the feedback of the presentation. The presentation made the concept of Climate Change clear to me. So I express my deep sense of gratitude to him through this report. As a souvenir a book was given to him.

Dr.Sarita Vig gave a lucid picture on 'Astronomy' with her powerpoint. She explained the basic concept and I am eager to learn the rest in the concepts only because of her presentation.

Astronomy : It is the study of heavenly objects.

Distance scales

o Astronomical Unit- Mean distance between sun and earth

o Light Year - Distance travelled by light in one year

Mass unit

o Earth mass

o Solar mass - commonly used mass unit

Radius unit

o Earth radius

o Solar radius - 7×10^8 m

Facts

o Sirius is the brightest star in the night sky. It is very much brighter than the Sun.

o There are 4 inner/terrestrial and 4 outer/Jovian planets in our Solar System. Terrestrial planets are rocky and small in size with high density, high temperature and a solid surface. Jovian Planets are not rocky with low density and low temperature.

Differentiate Planet and Dwarf Planet

o Planets are spherical, revolve only around the sun and has cleared its immediate neighborhood of all smaller object.

o Dwarf Planets are not spherical, not only revolve around the sun and has no clear neighborhood. Till today there are 5 dwarf planets being accepted.

Solar System : Our solar system not only comprises of the 8 planets but also may other bodies

- o An asteroid belt between Mars and Jupiter.
- o Comets - icy object made of CH₄, CO₂ and many other substances. They sublime near the sun and form tail. There are two kinds of comets : Long period and short period comet.
- o Quiver Belt : many small icy objects including comets form here.
- o Sun : It is the head of solar system. It do not have a uniform shape. Produce rays of all wavelength. The most abundant is Optical Ray. The Sun's corona is normally visible during total solar eclipse.
- o Constellations : There are about 88 constellations in our galaxy. The patterns in sky define them. eg : Orion
- o Stars : Primary inhabitants of Universe.
- o Interstellar Medium : the matter including dust particles, H₂ and cosmic rays between the space of two stars. There is a fact that 70% of our Universe has been occupied by Hydrogen.

Our Galaxy : Milky Way

- o There are 10¹⁰ galaxy and Milky Way is one galaxy among that.
- o The centre of our galaxy is a massive black hole.
- o Our solar system is present in one disk of our galaxy

ISRO's contribution to stars' understanding : AstroSAT- India's first Astronomy Satellite

Sabrina gave feedback. I am thankful to Dr.Sarita Vig for spending time with us in making us understand the basic concepts of Astronomy in a simple manner. She created a platform for the Young Scientists regarding study of space. She was gifted with a book and with this her session came to an end. Next Shri.S.Johnson invited all of us for the inaugural function of Vpro Technologies. Next we had our lunch and began our Lab visit by 2:00 pm.

Prof.Ramya assisted us in the lecture hall and gave a small lecture on 'Eyes in Space'. Eyes in space are nothing but satellites that monitor the sustainability of Earth and is used for remote sensing. In remote sensing many images taken from the satellite through which analysis can be done to gather information about Earth. To observe a large area you have to increase the height from which the image is taken. This thought evolved in France after the invention of camera. Nadhan got an idea that to cover a big extend and took image from a hot air balloon in 1827. Then it was taken in kite and later in bird legs. Next evolved space based remote sensing. Remote Sensing is mainly used to take many sorts of measurements. This uses the concept of reflectants. The energy reflected is measured and the image is based on reflected light. The analysis is also done based on the reflectants of the image. According to the EM Spectrum the visible light ranges from 0.4 to 0.7 wavelength. Satellites have sensors that has the ability to

detect wavelengths beyond visible light too. We can get satellite image in the form of digital one and the value of each pixel denotes the reflectants. She also said about how we are able to see objects in different colors using an example. When white light hits the red car, the red color is reflected by the object and the remaining are being absorbed. This same process happens in all the other objects too. GPS Satellite too follows the similar method and minimum 3 satellites are required for precise location. Then most of the students cleared the doubts based on the topic. Abina gave the feedback of the session and then a book was presented to her.

Next we went to a lab with her assistance and she explained the practical in Remote Sensing. ENVI Software is used in the analysis of the image and for image processing. Different features can be viewed and analyzed using the software. Different colors in the image indicate different feature. According to the spatial resolution the images are being seen in computer. Each pixel in the image has a value and more the pixel more the clarity of the image. The number of pixels in the image will be counted automatically and if needed it can be viewed. Each feature in the image can be classified using the options. The area can be found by multiplying the number of pixels and spatial resolution. We too were given chance to do the steps in computer. this gave all of us a wonderful time and I too came to the difficulty of Remote Sensing only when I had to do the practical. I should always be thankful to Prof. Ramya for teaching a vast concept in simple words. She taught the theory and practical in simple manner so that all could understand.

Finally we went to Geology Lab where we were aided by Mr. Vipin, Mr. Rohit, Miss. Akshaya and Miss. Pragya. Geology is the study of Earth. Geo means Earth and logy means science in Greek. Therefore Earth Science is Geology. Earth has three layers : crust, mantle and core. The core has high temperature and so has is in molten state due to its radioactive state in nature. The nuclear generation is based on this. Core is of two types : inner core (is in solid state because there is no sufficient place for it to melt and so is closely packed) and outer core (is in liquid state and there is enough space to hold the volume of liquid). Seismogram is an instrument to identify the above mentioned facts. This lets primary and secondary waves through the Earth. This is represented in seismograph. Edin Jijo gave the feedback and vote of thanks to them. With this the meet came to an end.

The TRAINING ON MONITORING SUSTAINABLE ENVIRONMENT THROUGH SATELLITE TECHNOLOGY was of success without any hurdles in the path. This gave me a new experience and taught me information on satellite technology. The lectures on all the topics will very useful to us not now but in the future. KAP is identifying the need of we children and are giving training accordingly. Since we are the people to build future India we should aware of all including the technologies. This meet gave a firm platform for that. So

THANKS TO KAP.....

THANKS TO IIST.....

"Knowledge, like air, is vital to life. Like air, no one should be denied it."

— Alan Moore

REPORT

The ninth meet of Kumari Arivial Peravai (KAP) was held at Indian Institute of Space Science and Technology (IIST), Trivandrum. On 23rd January 2014 we were asked to wait near Kalachanthai bus stand at 6:30 am. Around 6:45 am, an airbus named "Ajay Travels" picked us to IIST, Trivandrum. We enjoyed while traveling. After two and a half hours of traveling, we reached IIST campus. We took breakfast in one of the canteens. After the breakfast we gathered in a seminar hall around 9:50 am.

The session was anchored by Miss. Gby Atee, the leader of green team. She welcomed Miss. Dani Rovas, the co-leader of Maroon team to give an introductory speech on KAP's activities. She told that KAP is a voluntary group doing service in the field of science and technology. She then said some of the priceless activities performed by KAP among school students and finally concluded. Then Miss. Gby Atee spoke about the vision and mission of IIST. She said that IIST is Asia's first Space Institute. The Approval of Space Commission was received on 8th of November 2006. The Institute was inaugurated on 14th of September 2007. Then Mr. Umash Karni, working in IIST said that IIST has got so many missions. He also said we should give importance to the tasks that we are subjected to do in our life. We should give respect to two kinds of people like persons who are five years older than us and the persons who are five years younger than us.

He said that he was going to give a power point presentation based on the topic 'Learning or Education'. He asked us what kind of jobs that we are going to choose for your future. He asked, "Is your aim is to become a doctor, engineer, pilot or something else like that". The gathered students answered according to their future dreams. He told about tea tester. Tea tester is a person who prepares tea in the restaurants, bakery and so on. He told us, we all might have been using perfumes but there are still persons who find different kinds of smell to make a perfume. He advised us to have that curious towards achieving our goal in our lives.

Then he shared his childhood experience with the famous cricket legend Sachin Tendulkar. He said that he studied in Bombay and also he was a friend of Sachin Tendulkar. He said every day he comes to school with a bat. Even to examination hall he used to carry his bat with him. Sachin Tendulkar was so passionate towards his ambition. He advised us to be curious and courageous towards achieving our ambition also. He

listed some of the college and school dropout legends, who made popular and perpetual useful inventions to mankind such as,

Thomas Alva Edison

Albert Einstein

Wright Brothers

Henry Ford

Steve Jobs

Walt Disney

Harry Houdini

Bill Gates

Michael Dell and so on

He said that we should not go to school only just to learn, but we should go to school to learn about our surroundings and environment. He said we should use our education to help mankind for better future. He also told we get useful information, techniques and talents through good teachers, good text books, computers, library and so on.

He told that our mind has to be in alive and one of his friends would often say to him that horse will not sleep. So he said us to make our brain work like a horse. He stressed about "Curiosity". He said curiosity is the best approach to us in order to achieve our goal.

He then told that we might have heard that science is a collection of books but it is a wrong statement. Science is thinking, he said. He told that cooking is a most complicated science. He explained that there are also sciences in,

Painting

Playing sports such as Base ball, Soccer, Juggling etc.

Singing and so on

Then he said there is also science in sweeping. Normally sweepers use two kinds of brooms, he added. Also we can see science in hair dressing. Hair dressers are the ones who give shapes to our hair. He said some of qualities that a good scientist should have.

Those qualities are

Open eyes

Sharp ears

Sense of taste

Feel

Sense of smell

Curiosity

Analytical ability

Information.

Then he said about the science that we can see in cooking. In order to cook rice we have to boil water first. Rice could be cooked with boiling water, he added. If we handle food in an awful way, consuming those foods could also be awful. He also advised that, we

don't eat food on a regular basis it would be dangerous for our health. By saying this he concluded his talk. Miss. Reshma, leader of Maroon team gave feedback of his speech.

Next Professor Chandrasekar of IIST was called upon to give his speech. He said that he was going to give a talk about 'Climate Change'. First he gave definition for climate change. Then he raised a question what is climate change? And then he said that changes that occur in climatic conditions are called climate change. He said many examples regarding climate change. He also said that the climate changes in a circular fashion and it varies according to the location of places on earth. He also said the difference between climate change and variability. Then he defined weather. He defined weather is the state of atmosphere on any given day in a specific place. He also quoted a proverb of Mark Twain,

"Climate is what you expect;
Weather is what you get".

He then said, since climate varies across space, it is studied on a variety of spatial and time scales. Then he said about 'Paleoclimatology'. He said it is the study of changes in climate taken on the scale of the entire history of Earth. He said Paleoclimatology delves into the deep history of past climate variation through what are called proxy records. He said that studying prehistoric variations can also provide important clues about what to expect in a warmer world. He told Galileo is a person who invented Thermometer. He then said about 'Green House Effect'. He said that green house effect applies to natural and human produced additions of carbon dioxide. Without green house gases including carbon dioxide, methane, nitrous oxide and water vapor earth would be too cold to inhabit and water vapor is the most abundant of the green house gas on the planet earth accounting for about 60% of the current green house effect.

Then he said radiation comes from sun and it is made up of ultra violet rays and other rays. Because of sun the earth has been radiated. He also said when we put carbon dioxide molecule in atmosphere it stays there for more than 1000 years. Increase in the amount of carbon dioxide in atmosphere increases global temperature. The increased amount of carbon dioxide in atmosphere will also cause greater evaporation and increase the amount of water vapor. He also listed out some of the effects of climate change such as,

- Melting of polar ice shields.
- Sea level rising.
- Increased Evaporation.
- Crops withering and all that.
- More Heat-Related Illness and Disease
- Wildlife at Risk
- Higher Temperatures
- Stronger Storms and Increased Storm Damage
- Changing Landscapes and so on.

He also said that during 20th century sea level has risen for 15 cm more. He said that glacier and permafrost are melting. Over the past 100 years mountain glaciers in all areas of the world have decreased in size and so it has the amount of permafrost in the Arctic Ocean. Green land ice sheet is melting faster too, he added. He told that Arctic sea ice is melting. The summer thickness of sea ice is about half of what it was in 1950. Melting ice may lead to changes in ocean circulation. Plus melting sea ice is speeding up warming in Arctic area. Also crops are withering due to such climatic changes. He then concluded his speech. Miss. Dani gave feedback of his speech.

Followed by him Dr. Saritha, was called upon to give away her speech. She started her speech with an introduction to Astronomy. He gave a talk about scales and measures used in space. She said about light year, astronomical unit, earth mass, and so on. She said astronomical unit means a mean distance from sun and earth. Then she said about sun and celestial objects that are gravitationally bound to it. There are 8 planets in the solar system. And there are totally over 166 moons. She said inner planets are known as terrestrial planets and outer planets are known as Jovian planets.

She also defined Dwarf planets. Dwarf planets are massive enough to be in spherical shape due to its own gravity but it is neither a planet nor a moon. She named out some of the Dwarf planets as, Pluto, Eric, Ceres, Haumea and Makemake. She said that any of the heavenly body orbiting the sun would have enough mass to form itself as a sphere. Small solar system bodies such as asteroids are Eros, Ida, Gaspra and Mathilde.

Then she said about comets. Halley's Comet is the famous one that comes for every 76 years. The sun is the head of the solar system, she said. Sun is the most important source of energy that supports life on Earth. We can see the dark patches on sun when we see it with a telescope. She also said about UV line, corona. She said that in ancient times constellation is only referred to brightest stars. She said about 'Orion Constellation'. There are 88 constellations in space, she added. She also said that stars are named after Greek letters. She said the star types such as O, B, A, F, G, K and M-type stars. Sun is a G-type star, she said. Stars are the primary inhabitants of the universe. She also said Interstellar is a medium that contains gases and dust present between stars. She also said Milky Way has over 1011 stars and cluster of galaxies. The cluster of galaxies consists of group of galaxies. In the universe there are over 1021 stars and 1010 galaxies. At the centre of Milky Way there is a massive black hole. She also said 'Astrosat' is the first astronomy satellite in India. She said universe is formed by a 'Big Bang'. Saying this she concluded. Miss. Sabrina member of Red team gave feedback of the talk of Dr. Saritha.

After the speech section we got a pronouncement from Mr. Johnson, Head master RTD he informed us regarding the inaugural function of V-Pro Technologies formed by Mr. Vinoth, who is the son of Mullanchery M Velaian, KAP Organizer. He welcomed all the KAP students to attend the inaugural function of V-Pro Technologies. After this announcement we were said to take lunch at 01:00 pm.

After lunch we were taken to a Lecture hall. Professor Ramiya gave a talk on the subject of 'Eyes in Space'. She said that today we can learn about remote sensing. With the help of remote sensing technologies larger area in earth where humans can't go can be covered and studied. She said Nadar who was a French scientist captured the images of the earth from hot balloon flying in the sky. She also said about the first photograph taken around 1827. In those days they also used cameras tied with kites and birds to take pictures of the parts of earth.

Then she showed the images of the satellite. We also taught the basic concepts of remote sensing. She said electromagnetic spectrum covers the areas of earth that human cannot see. If the white ray of light falls on a red surface, the light rays other than red light gets absorbed and only red light is reflected. And if the cyan ray of light enters the red surface absorbs the green and blue light and no light gets reflected. Trees and leaves appear green because of the chlorophyll, she added. She also explained about spectral reflectance curve of common earth features and digital images. She also said three satellites are required to cover a location or an object of earth in all angles as shown below.

After that Professor Divya described about Image Processing. She said ENVI is the image processing software. She said we would use this software to explore satellite images. KAP students are allowed to do some practical on those images. Subsequently Professor Ramiya showed a satellite image of India denoting rivers, mountains, sea borders, crop lands, soil, bare lands, water bodies, forests, trees and bushes and so on.

Then Professor Mahima and Professor Akshaya said that they are going to say about minerals of earth. When white and black minerals combine together they form rock. We saw white and grey colored materials. Additionally there are two types of minerals. One type is white in color and the other type is greenish in color. White color in minerals is due to its aluminum content. Due to transaction the other side appears black. We also saw some metabolic rocks, igneous rocks, sedimentary rocks and leguminous rocks and also amethyst, Ruby, Molybdenum, Copper ore, and Analog rocks. By showing these rocks she said all these rocks can be melted at a temperature of 5000 o C to 6000oC. She said we could find Gypsum ($2\text{H}_2\text{O}$) in Mars. According to the chemical property Gypsum cannot appear without water. So it is believed that Mars has water. Talcum is an important mineral obtained from Mars. Water can also be found in Mars, she said and concluded.

Finally the program was finished. Then we finally arrived to Kalachanthai bus stand around 6:30 pm. During our travel back we were informed about the location of our next meet.

By this program, I learnt more about astronomy, satellites, planets and dwarf planets, remote sensing, climate change and minerals. I thank all the scientists, professors, elders and faculties of KAP who shared their thoughts with us so that we learnt more

things that we had never known before. I look forward to the next programme with enthusiasm.

**J.M.JERESHEA
MAROON TEAM**

"There is no wealth like knowledge, and no poverty like ignorance.

- Buddha

The Ninth meet of Kumari Ariviyal Peravai (KAP) after the selection process of Young Scientists was scheduled on 23rd January 2014 at Indian Institute of Space Science and Technology (IIST), Trivandrum. We waited eagerly in Kalachanthai bus stand at Marthandam. A tourist bus arrived around 6:45 am. After a long travel we arrived at IIST campus. We took breakfast there in one of the canteens. The canteen looked so good and neat. We saw information boards hanging in many spots. Then we were taken to the university. There we were seated in a seminar hall and the meeting was started around 9:45 am. Miss. Gby, leader of Green team compered the session. Firstly she welcomed everybody and called upon Miss. Dani Rovas, leader of maroon team to say about KAP and its activities. She said that, KAP is a voluntary organization. It gives various opportunities to the students by taking them to different institutes, research centers, and so on. KAP activities include Newspaper documentation, Feedback oration, Art of Report writing. She described about these activities in such a way that, Newspaper Documentation i.e., cutting out the important news from newspaper and pasting it into a note book for future references.

Feedback Oration i.e., after listening a talk given by any personalities one of the KAP students will deliver feedback regarding their talk.

Report writing i.e., after the completion of each meeting held by KAP, the students will be preparing a report that contains each and every activities carried out in that whole meeting. The students will send their reports to the KAP faculties after completing their individual reports. And the best reports among the students will be published in the KAP website. By doing so, visitors of KAP website can know more about KAP, its activities and contribution towards the development of students.

Saying this she concluded her speech. And then Miss. Gby, leader of Green team thanked her for giving the speech and said some more information about IIST. She said that, "IIST is the first university/space technology in Asia to study and research the outer space. It was inaugurated in the year 2007 of Sep 13 by Mr. G. Madhavan Nair. She said that, it is located at Valiamala in Thiruvananthapuram, Kerala. She said that it was sponsored by ISRO under the department of Space. Then she added that, Dr. A.P.J. Abdul Kalam, former president of India is the chancellor of IIST. Subsequently she said that we are about to learn about satellites and their developments, Image processing and so on.

After saying this she welcomed Dr. Umesh Gathi, to deliver his speech. He said, that we are about to gather information on remote sensing. He said that he loves children very much. There are two categories of children. One category is five years older than us and the other category is five years younger than us. Since we are young we study mathematics quicker. He also said we should not learn only to get pass marks. If we study, we are giving exercise to brain. He advised us to do exercise everyday if not we would lose our ability sooner.

Afterward he named out some professions like doctor, engineer, scientists, etc and asked how many of the students want to become like that. All the students raised their hands. Then he named some of the professions such as teacher, astronaut, pilot and so on and asked how many of the students want to become like that. No one raised their hands. Then he explained why we don't raise our hands for the lately mentioned professions. That's because we were not aware of such jobs and that's why we are not interested in it. He also said an example of it. That is we use perfumes every day. If we move on to a shop we could able to see twenty two to twenty five varieties of perfumes. We should remember that the persons who are producing those perfumes won't find it difficult why because they love the job they are doing.

Next he said that IIST is an educational institute. Then he showed us a picture that depicted a father walking with his daughter in a natural place. We could able to notice that a father is moving forward but his daughter is observing the nature surrounded her. He looked at that picture and said to us that it is known as education because the little girl is gaining knowledge from her surroundings. Hence we need to know it is a necessity to gain more knowledge from our surroundings.

And he said that, each person is a scientist. For example, he mentioned some of innovators names such as Thomas Alva Edison, Henry Ford who lived in 19th century. And he said that those people not only gained information from the school and books instead they also gain information from the surroundings also. Then he mentioned some of the astronauts such as Kaplana Chaula, Sunita Williams, and Rakesh Sharma and so on. He said that those astronauts know the challenges, risks and difficulties of being an astronaut but the only reason they carried out their profession in spite of the difficulties is, their curiosity towards their goal of become a successful astronaut. So we should have curiosity towards what we are doing.

Then he said if there are three varieties of food items such as mango, ice-creams and biscuits. Some people will ask to serve a particular food item by naming it but some others order to serve any of those food items without even mentioning the names. From this we could able to understand that the second type of people don't have curiosity towards what they are doing. Also he said that the people who are living in Kerala drinks only warm water and he mentioned that drinking warm water is very hygiene. He said ice cream tastes better when we drink warm water before consuming it.

Then he gave some information about science. He said that, we think that science is a collection of books. But he said that, Science is not only a study of Math or biology or chemistry instead it is a way of thinking. Then he took himself as an example. Since we were seated in Air conditioner room his voice slowly changed. It is because his throat was swollen, he added. He informed that it is a science because by this we had been observed something. He also said that cooking is a complicated science. He said that Art is also a science. Because when we are painting, we use colors so painting is also a form of science. He said that according to the surface of the floor we are using the broom sticks. And the sweepers will do a kind of action that is the sweepers may hit the broom stick in a plane surface to level it. So it is also known as science. Hence science and technology is in everywhere in every part of our life and in every action we are doing. Then he showed us a picture of Road Roller machine. And he said that in the road roller machine he wants to be a driver. He also said the difference of Indians and the foreigners. He said that the foreigners are very fervent to learn but we Indians won't have curious to learn. Then he said some characters that a good scientist should have. He said that a good scientist should have the following characters such as,

- Open eyes
- Sharp ears
- Sense of taste
- Feel
- Sense of smell
- Curiosity
- Analytical ability
- Information.

Then he said we should plant and protect trees for the sake of good nature. But we should not say not to cut trees to the wood cutters because a wood cutter lives by cutting and selling trees. This is their part of life that helps them to survive. Therefore it is necessary for them to cut the wood. He also advised that, we should eat food regularly otherwise it is dangerous for our health. Next he said about an example of Refrigerator. In top part of refrigerator there would be a freezer. When we open the freezer if the cooling is very high it means that it is consumes more electricity. He said that we can see science in every part of our life. Then he said that we wash our clothes every day. But for washing 1 cloth we require 8 liters of water. He didn't say that we should not wash our cloths instead he said that we should use water conservatively. Then he said being a scientist is not only putting white and white coats and cloths instead a good scientist is a person who innovates something useful in every part of their life. Then he said no matter what, science is a part of our life. He wished us to become a scientist and concluded. Then Reshma, leader of maroon team gave feedback regarding his speech.

Then Mr. Chendrasekar, worked at IIST gave a speech regarding the topic Climatic Change. He defined weather that it is an atmospheric condition. He also specified that the weather changes throughout the day and it changes place to place. Then he said about climate. He defined that, climate change occurs for a long period of time. Due to serious climatic conditions mankind face severe impacts. Cricket matches had also delayed for some days because of such serious climatic conditions. Also he said that we choose and pack our cloths, dresses according to the nature of the places we visit. For example if we visit Delhi we will pack sweaters and if we visit Coimbatore we would pack cotton cloths since the climate would be so cold in Delhi and the climate would be so light in Coimbatore. And he said about climate variability. He then defined weather as a state of atmosphere in any day of any place. Climate varies in space also, he added. So climate is studied on a variety of spatial and time scales. He also said some techniques to identify the changes in climate.

Then he said about 'Global Warming'. For global warming identification the scientists have some observation record. Then he said about 'Paleoclimatology'. He said it is the study of changes in climate taken on the scale of the entire history of Earth. It develops into deep history of post climate vibration through what we call as 'Proxy Records'. Then he said about inventions. He said Galileo invented thermometer nearly 350 years back. We still use thermometers to analyze temperature changes. Then he said about 'Green House Effect'. First He said, over 100 years back French researcher Jean Baptiste and Swedish scientist Svante Arrhenius predicted that the increasing amount of carbon dioxide in the atmosphere will warm the entire earth since CO_2 strongly absorbs radiation. Also CO_2 is transparent to solar radiation and it has strong absorption tendency. Earth is receiving more radiation because of green house effect, he said. Also he said water vapors more when the earth warms more. Increased CO_2 in the atmosphere increases the global temperature thus increases greater evaporation. This reduces the amount of ground water. He showed a picture that depicted the global atmospheric concentration of carbon dioxide over times. He further showed a figure that depicted the developments we had in methane and hydrogen. Then he said about the 'Effects of Climate Change'. Some of the effects of climate change such as,

- Melting of Glaciers
- Sea level rising (It rose over six inches).
- Increased Evaporation
- Crops withering and all that.

Next he said about 'Ocean Circulation'. He defined it as "Ocean circulation is the large scale movement of waters in the ocean basins". He showed us a picture that depicted the global average temperature. He said CO_2 stays in atmosphere for more time than the water vapor. Finally he concluded. After his speech, Miss. Dani Rovas, co-leader of Maroon team gave a feedback of his speech.

Then Dr. Saritha, worked at IIST was welcomed to give away her speech. She said about 'Astronomy'. She defined astronomy as the study of astronomical objects and heavenly bodies. We use centimeters, meters, inches, to measure objects. But in astronomy we use 'light year' for measurement of distances between heavenly bodies. She said one light year equals 9.5×10^{15} meters. Also she said one Astronomical Unit equals 1.5×10^{11} meters and it is a measure used to calculate the distance from the Earth to the Sun. Also she said one Parsec equals 3.086×10^{16} meters. Then she said we use grams, kilograms to measure the weight of the objects. But in astronomy we use Earth Mass to estimate the weight of heavenly bodies. She said one earth mass equals 5.97×10^{24} kg. While saying about the measurement of heavenly bodies she then explained about solar system. Sun and other celestial objects are gravitationally bound to it. In our solar system there are eight planets. Each planet has its own moons. She said Pluto is called as Dwarf planet since is neither a planet nor a natural satellite but it as a size of a planet. She then explained about the difference between the Terrestrial and Jovian planets.

Terrestrial Jovian

Close to Sun Far from Sun

Closely spaced orbits Widely spaced orbits

Small masses Large masses

Small radii Large radii

Predominantly rocky Predominantly gaseous

Solid surface No solid surface

High density Low density

Slower rotation Faster rotation

Weak magnetic fields Strong magnetic fields

No rings Many rings

Few moons Many moons

Then she explained more about Dwarf planets. A dwarf planet is massive enough for its gravity to turn it into a nearly round shape. There are many Dwarf planets in the solar system. Whichever body that orbits the sun has enough mass to form a sphere shape itself.

Then she explained about asteroids and comets. She said about 'Mathilde', an asteroid which is 59 km away. The she said about comets. Comets are icy objects. There are two types of comets. One type of comets lives for fewer periods i.e., less than 200 years. Other type comets live for more periods i.e., more than 200 years. Then she said some information about Sun such as,

- ☐ Sun is a major source of light and it is the star at the center of our Solar System.
- ☐ It is the most important source of energy for life on Earth.
- ☐ The Sun is a nearly spherical ball of hot plasma that generates a magnetic field via a dynamo process.

□ The diameter of the Sun is about 109 times that of Earth and the mass of the Sun is about 330,000 times that of Earth.

She showed a picture that depicted the Ultraviolet (UV) rays coming out of Sun. Also she pointed out some information on UV rays.

The sun emits Ultraviolet rays that cause sunburn, and has other medical effects such as the production of vitamin D. UV rays are strongly attenuated by Earth's ozone layer.

The Sun's color is white when viewed from space or when high in the sky. It scatters light into violet, indigo, blue, green, orange, yellow and red.

Then she said the collection of stars is called 'Constellation'. She explained about 'Orion Constellation' with a picture. There are 88 constellations and she mentioned the colors of stars. Stars are named by Greek letters namely alpha, beta, gamma, and so on. Some stars are blue in color, some are red. The colors of stars are due to its surface temperature. She listed out the types of stars, their colors and their temperatures and are as follows as,

Star type	Color	Temperature (K)
O	Blue	41,000
B	Blue	31,000
A	Blue-white	9,500
F	White	7,240
G	Yellow-white	5,920
K	Orange	5,300
M	Red	3,850

The sun comes under G-type here, she said. She also said that the galaxy is spherical in shape. She said stars are the primary inhabitants of the universe. Interstellar Space is the physical space within a galaxy not occupied by stars or their planetary systems. She also said the Milky Way is the galaxy that contains group of stars and group of solar system. A Milky Way contains over 1011 stars. She showed an image of galaxy-the Milky Way. Then she said about satellites and telescopes such as UV telescopes, x-ray telescopes, Infra red telescopes. Telescopes contain radiator plates and lenses to capture far away objects. She concluded by inducing interest in us to know more about the astronomy. We gained more information about heavenly environment through her speech. Miss. Sabrina, member of Red team gave her feedback of the speech of Dr. Saritha.

After that section we heard an announcement from Mr. Johnson, Headmaster RTD. He informed us about the inaugural function of V-Pro Technologies started by Mr. Vinoth, son of Mullanchery M Velaian, KAP Organizer. He welcomed us to attend the inaugural function of it. Then we had lunch sharply at 01:00 pm.

After lunch we went for Lab visit. First we were taken to a Lecture hall. There Professor Ramiya gave a talk regarding 'Eyes in Space'. Satellites are launched in order to

capture far away objects that human eyes cannot see. With the help of satellites humans can study the characteristics of heavenly environments. There are many satellites located around earth that take picture of various objects and send back to earth. Humans analyze those images with the help of computers. The she said about a French photographer, caricaturist, journalist, novelist, and balloonist named Nadar. He conveyed an idea of flying a balloon and being in it with a camera to capture images from above. With the help of cameras in hotter balloon Nadar went and took photos. Professor Ramiya showed the first photograph captured by flying in a balloon. Moreover they tied cameras in kites and captured bird life such as birds, their nests, their eggs and their life style. Also Wright brothers invented aircraft that stepped out for air transportation.

Then she explained basic concepts on Remote Sensing. With the help of satellites we could able to see all the parts of earth. Moreover she said about reflectors and electromagnetic spectrum. She said some minute measurements such as,

1 micrometer = 1×10^{-6} meters

1 millimeter = 1×10^{-3} meters

1 centimeter = 1×10^{-2} meters

She then said Light is electromagnetic radiation that is visible to the human eye. Light constitutes seven colors namely violet, indigo, blue, green, orange, yellow and red. When a light falls on a red surface, the surface reflects only red light and absorbs all the other colors. When a light falls on a black surface, the surface absorbs all the colors. She also said that the color of leaf is green because of chlorophyll. She showed a spectrum chart as,

Incoming the Sun INFARED

Ultra violet

Visible

Emitted by earth

According to the spectrum chart green wavelength is 0.5. Our naked can only be able to see from 0.4 to 0.7. Green color reflected more than blue and red in a leaf. So we could able to see only green layer. She also showed the digital image which are captured by satellites. She then described about image processing. She defined pixels, as it constitutes images. Digital images constitute numeric values. Moreover she said over 24 satellites rounding around the earth. At least 3 satellites are required to capture an area in earth in all angles. She then concluded by saying basic applications of remote sensing. Miss. Abina, leader of Red team said feedback of the lecture given by Professor. Ramiya.

Then we moved onto Remote sensing laboratory. She showed the image of India taken by a satellite. In that image, the rivers are mentioned in blue colors, borders are mentioned in block surfaces. We could able to see buildings, houses, cars and agricultural fields. Agricultural crops are referred as yellow color. Pure water can be identified with

black color. She said remote sensing helps us to find various types of soil on earth. She also mentioned that spatial resolution helps us to view the satellite images clearly. We have also worked with the images in computers. And we were taught to handle satellite images with the basic images tools.

Then we moved onto Geology laboratory. Professor Vipin explained us about the geography of the earth. He said earth is spherical in shape. It consists of three layers namely the crust, the mantle and the core. He also said there will be gases but it will be in the mixture of crust. Two forms of crust are ocean crust and continental crust, he said. Volcano is a rupture on the crust of Earth that allows hot lava, volcanic ash, and gases to escape from a magma chamber below the surface. Earth's volcanoes occur because its crust is broken into 17 major, rigid tectonic plates that float on a hotter, softer layer in its mantle. He also said during volcanic eruption magma comes out and lava doesn't come out. He also said about 'Seismograph'. Seismometers are instruments that measure motions of the ground, including those of seismic waves generated by earthquakes, volcanic eruptions, and other seismic sources. During volcanic eruption, the inner core is in solid form. Only the outer core is in liquid form. Earthquakes generate seismic waves which can be detected with a sensitive instrument called a seismograph, he added. We also saw different types of rocks there. Finally Mr. Edin Jijo, member of Yellow team gave feedback about the lecture class conducted by Mr. Vipin.

After those lecture classes we were returned home by bus. On the way back in bus, we were informed about the next meet venue and time. They said the next meet will be held at Maria College, Aatoor on 14th of February. We were informed about the guidelines of how to present the presentation of our topics in the next meet. Then there we had a lot of enjoyment in the bus. Then we finally arrived to Kalachanthai bus stand around 6:30 pm.

Through this IIST visit I gained more knowledge and information about astronomy, satellites, planets and dwarf planets, remote sensing and climate change. And also I came to know about the creation of earth, its beings and heavenly bodies. All the personalities treated us in a friendly manner. The way we enjoyed in the bus still remains in my mind. I express my gratitude towards all the dignitaries, professors, and scientists of IIST and the faculties of KAP for their valuable time to share and teach the facts about space and geology.

"The roots of all goodness lie in the soil of appreciation for goodness!!!The root is KAP!!!
Thank you KAP!!!!"