



MRTHKALA

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The college campus is green and eco friendly in nature. Several environmental resource management measures have been implemented and "being green" is a part of Mount Carmel culture. I am glad that the environmental science department is coming out with their very own newsletter. I wish them all the best!
-Dr. Sr. Arpana, Principal

I am very pleased to hear about the new ventures and initiatives started by the Department of Environmental Science. I wish them all the success for their future endeavours.
-Ms. Vimala C. M., Dean of Science

Sustainability has come to the forefront in the wake of increased global understanding that economics, environmental health and human well-being are interconnected and interdependent. The Department of Environmental Science is at front line of environmental protection and policing. We ensure that the environment is protected and monitor changes in environmental trends to detect early warning signs of neglect or deterioration.

Through our actions, we seek to promote the health of our community and our planet while performing valuable research that contributes to a stronger, healthier relationship between humans and the environment.

The VISION of the department is to empower students with the required skills for protecting our fragile environment, Our MISSION being the overall development of Commitment towards practicing and preaching activities that lead to a pollution free environment.

Thus, the main OBJECTIVES are to help students acquire skills for identifying and solving environmental problems and to develop evaluation ability and to consider the environment in its totality. Protecting our environment is a huge responsibility, and networking with a number of organizations that carry out specific environmental functions gives the students ample number of opportunities for their commitment and stewardship towards mother earth.



-Dr. Helen Roselene, Associate professor and Head, Department of Environmental Science

Mother Nature is the most dynamic entity that the human population has witnessed till now.

Change is constant in nature and this is exemplified by processes such as ecological succession of communities, formation of precious metals and minerals, evolution and even negative effects like climate change phenomena, pollution of land, water and air typify change. If we only understand the basics of nature's character and flow along with it, it would be much easier for us to adapt, change and survive...



That is the key to success in survival.
-Ms. Ranjini Ramesh, Associate Professor, Department of Environmental Science

Drinking water quality Assessment

The department regularly monitors the quality of drinking water in college, so there is no need to fret, your drinking water in college is safe for consumption.



Workshop: Remote Sensing & Geographic Information System



The Department conducted a workshop on 'Remote Sensing & Geographic Information System' on 23rd Jan. 2017. A geographic information system (GIS) is

a computer-based tool for mapping and analyzing feature events on earth. GIS technology integrates common database operations, such as query and statistical analysis, with maps. GIS manages location-based information and provides tools for display and analysis of various statistics, including population characteristics, economic development opportunities, and vegetation types.

Remote sensing is the art and science of making

measurements of the earth using sensors on airplanes or satellites. These sensors collect data in the form of images and provide specialized capabilities for

manipulating, analyzing, and visualizing those images. Remote sensed imagery is integrated within a GIS.

The students were greatly benefitted by the learning they received from Dr. A. K. Jeelani (Prof. of Geology) and Mr. Shashank (GIS consultant). The applications of a Geographic Information System is vast and very relevant to our rapidly changing world that is in desperate need of access to large data bases of information that form the basis for making very important decisions that affect our natural environment. The information gathered can be used to analyze several environmental trends and to generate algorithms based on which predictions of the future can be made.



Water conservation conference - A report

Everyone knows that man is seventy percent water. The manner in which we treat our water bodies is ultimately a reflection of how we treat ourselves. The water conservation conference was held in Gandhi Bhavan on the 8th of September 2016, in Bangalore, presided by the 'Waterman of India' Mr. Rajendra Singh. The seminar left everyone conscious of the individual responsibility that each one of us have to conserve and protect this precious resource. Mr. Rajendra Singh shared his experience on river regeneration and water recharging in over 25 countries.

He stressed on the importance of the health of our rivers. A healthy river is indicative of a healthy population-free from diseases. Although the water shortage looks irreversible, he emphasized that if we take action now, we can still clean up our water bodies and that there is still hope. He encouraged people not to remain silent, but to start movements in and around water bodies to protect them. He spoke a great deal about the importance of community action and the fact that the next generation has to play an active role in water conservation.

There were several other speakers at the conference, environmental activists, journalists, scientists, conservationists and students formed a large part of the audience. The importance of Rain water harvesting was highlighted. The potential of Rain water harvesting is vast with its ability to recharge ground water aquifers, rather than allowing rain water to run off into storm water drains, we ought to make full use of this resource for our individual requirements.

There was an interactive session towards the end of the program where students were allowed to ask questions. "What profession can we take to conserve water?" was one of the questions posed by an innocent student of eighth grade. All of us who attended the conference walked out with the hope that there is a possibility of a future without water scarcity. It has impacted me personally, reminding me of the fact that water is a common resource and is the collective responsibility of every individual to protect and defend it.



Projects undertaken by the ever enthusiastic students of Environmental Science

A glance at the research projects undertaken by the third year students guided by Dr. Helen Roselene:

Analysis of organic and commonly sold milk samples for nutrient value and presence of adulterants

With increasing concerns over contaminants in milk, both intentionally and unintentionally added, a growing number of people are switching to organic milk. The study involves testing organic and conventional samples of milk to determine their nutritional value and to check for the presence of common adulterants. The results showed that organic milk (one that has not been subject to processing) as opposed to conventional milk, has a higher calcium, protein and fat content with no traces of adulterants.

-Raagini Muddaiah (3rd yr. CZE)

Air pollution tolerance index of common trees in different study sites

Air pollution is one of the severe problems the world is facing today. It deteriorates the ecological condition and can be defined as fluctuation in any atmospheric constituent from the value that would have existed without human activity. Over the years, there has been a continuous growth in human population, road transportation, vehicular traffic and industries which increases the concentration of gaseous and particulate pollutants. Three samples were selected to determine the air pollution index. The samples were taken

from polluted area (roadside) and from the non polluted area (college garden). Four parameters were kept in mind while determining the index namely ascorbic acid, pH, water content and total chlorophyll.

-Hiba Banu, Ruman Rashid (3rd yr. CZE) & Norchenla Dolkar Namka (3rd yr. CBE)

Purification of water from heavy metals using okra biofilter

The project seeks to bring about the removal of

heavy metals like chromium, copper and clay from water using a biofilter made from dried okra. The mucilage from the okra gum acts as an adsorbent and a natural coagulant for the removal of unnecessary pollutants. Solutions containing high amounts of chromium, copper and clay are passed through the okra biofilter and analysed for results to demonstrate the efficiency of the hypothesis that okra gum could revolutionize water purification by proving to be an easily accessible and effective filter.

-Harleen Kaur Johal (3rd yr. CZE) & Samia Akhtar (3rd yr. CBE)

Comparative Analysis of different types of composts and their influence on the nutrition and development of *Solanum lycopersicum* (tomato) and *Trigonella foenum-graecum* (fenugreek)

The study was a comparative analysis of three different types of compost- Naturally produced pit compost (NC), Vermi compost and Organic Waste Converter produced compost (OWC compost) to determine the most efficient. The physical parameters analyzed were- pH, electrical conductivity (E.C) and water holding capacity (W.H.C). The chemical parameters analyzed were- organic matter, nitrates, phosphates, potassium, calcium and magnesium content. The microbial isolation, enumeration and colony counting of bacteria, actinomycetes and fungi were also performed. Soil was also tested alongside the compost since it was the control. Two species (Tomato and fenugreek) were chosen and grown in NC and OWC compost, the potting mixture was made by mixing compost and soil in 1:5 ratio. Tomato was allowed to grow for a period of two months and fenugreek for a period of one month. The leaves were tested for their chlorophyll and ascorbic acid content in order to compare the nutrient value and development of the plants in the different potting mixes and the control.

-Archana Devarapalli & Sherin Shiny George (3rd yr. CZE)



Reports of projects undertaken by the dynamic and environmentally conscious second and first years

Analysis of Dissolved Oxygen - Ulsoor lake

In September 2016, the water from Ulsoor lake in Bangalore was analysed to determine the amount of dissolved oxygen present. This was done primarily to investigate the extent of aquatic life

these water bodies could support. The dissolved oxygen was determined for the Ganesha immersion tank, as well as that of the main water body. Dissolved oxygen was calculated using Winkler's Method, keeping in mind that the healthy range of dissolved oxygen is 6-8mg/L. The results

showed that the level of dissolved oxygen in the Ganesha immersion tank was only 1.5mg/L, well below permissible levels that are capable of supporting aerobic life. Samples taken from various sections of the main water body showed a differing values ranging from 5.8 mg/L, 12.54 mg/L and 10.58 mg/L. One of these values is on the border of the permissible limits, whereas two of these are higher. It should be kept in mind that Ulsoor Lake, is a sink for a fair amount of the sewage produced by the city. The untreated sewage that was discharged into the lake was responsible for the widespread death of the fish on at least two occasions in recent times. The untreated sewage brings with it a host of microbes, including E. coli, found in the human gut. These microbes rapidly deplete the oxygen supply of the lake denying the fish and other organisms sufficient oxygen for survival. This resulted in the lake becoming a eutrophic water body unable to support fish. The water was subsequently pumped out and replaced. This could offer an explanation as to why the dissolved oxygen levels are higher than permissible limit in certain areas of the lake. It is simply because these parts still do not support large amounts of fish that consume the dissolved oxygen leading to the steady decrease in its concentration. Ensuring that the oxygen is sufficient to support a variety of life forms necessitates the proper treatment of sewage before it is discharged into the lake. In January 2017, the Karnataka Pollution Board announced that they will be setting aside 4 crores to facilitate the development of a sewage treatment plant at Ulsoor lake. The project aims to be completed in six months.

Tree mapping in the college campus

The environmental science students of the second year took on a venture to map the trees on the

college campus. Students did a tree census of the campus, took measurements of heights and circumferences of all the trees on campus. Different tree species and genus names were noted and learnt, whilst mapping the surplus of more than a hundred trees on campus we were enlightened by the plethora of trees, the various species, the array fauna it housed and its kaleidoscope of flowers.

This project opened our eyes to the minuscule details and made us privy to the various flora and fauna our college is an abode to. All the data collected was analyzed statistically and mean heights and Circumferences of different species were calculated. The tabulated data was also used to understand various aspects of biostatistics and mathematics. With the data available the Department aims to create a full fledged accurate tree map of college showing the rich floral diversity

Waste segregation in college

The department of environmental science of Mount Carmel College believes in a more practical approach of teaching the students to go green.

As an internal assessment the students of the second year had a wonderful opportunity to track the waste segregation in campus during fest and non fest days. Littering analysis was done on five fest and five non fest days in three locations on the campus.

The result proved that the amount of waste produced (paper, plastic and food) during the fest days are enormously high compared to non fest days due to the increase in the number of food stalls inside the campus. Observations were also made on the segregation of waste in classrooms where segregation is not primarily considered because there is only one waste bin in each room. Data regarding the amount collected, reused, recycled, composted or disposed off in a proper manner was also analyzed.

Segregation is important for better waste disposal and encourages more recycling and reuse of matter. More awareness has to be created among the students.

The results obtained were submitted in the form of a report showing figures of littering and amount of segregation. Suggestions were given to the college management on improving segregation practices and proper disposal of everyday waste.



Events of the ECO CLUB

The department for the first time opened its doors to the environmentally conscious students of MCC, in a venture to spread awareness on all environmental issues and to bring about a general appreciation for nature. The Eco club is an extension of what the department stands for and believes in as a whole.



Highlights of the Eco club

As part of the effort to save this lake Horamavu

Parisara Abhivruddhi Samiti (HPAS) organized a cleaning and beautification event. The students of the eco club participated in this event. They were made aware of the problems that local water bodies in Bangalore face. The area surrounding the lake was a dumping ground for waste. Through community effort, the area around the lake was cleaned up and saplings were planted to prevent the further dumping of wastes.

Visit to Kasa Rasa 2

The centre is an initiative of Saahas, an NGO working for effective waste management, supported by BBMP and KSPCB. The students

showed keen interest in the centre. They came to be made aware of lifestyle practices they can adopt to reduce waste. The students were encouraged to segregate their wastes and were encouraged to practice waste segregation at home. They were also encouraged to recycle. At the unit, the dry waste is segregated into 12 different categories. It was an interesting experience to see how large scale waste is managed at the centre. The students empathized with the workers dealing with the wet and dry waste and were made sensitive to the issue of waste management.

Tree Mappig - Census

In collaboration with the Indian Institute of Science and Citizens for Bengaluru (NGO) the students of the eco club volunteered in conducting a tree census for all the trees in the stretch of the proposed steel flyover in Bengaluru. The Government proposed to build the steel flyover from Basaveshwara Circle to Hebbal flyover with connecting



The student's speak...

I Remember

I remember, nature's silence

It suffers violence,

Without any greed

It fulfilled our needs.

I remember those destructions

Which were caused by constructions,

Everyone wants to manipulate (nature) it

But remember, nature always teaches us.

I remember the love

That starts a prose,

Nature is a creator

Everyone revolves around it as creation.

I remember, the phenomenon

That beautifies nature,

The nature, of everyone's fulfillment

Which granted our desires.

I remember, the truth

Nature- full of peace and empathy,

We never gave sympathy

Nature gives us till the edge of life.

I remember, the gift of god

Which is always with us,

When we're happy or sad

It's a friend who never escapes us.

-Neelam Chaudhary (1st yr. CBE)

Bird watching in Amritsar

Birding is a real fun thing. You not only learn and enjoy yourself while observing birds but also discover yourself along the journey. I was in Amritsar for my holidays and due to an unfortunate lack of time, could not make it to Hari-ke-pattan (wetland), a birder's paradise. Instead, I indulged myself by bird watching in a beautiful village near Taran Tarn Sahib. The first bird that I spotted was a kingfisher perched on a wire out in the open agricultural fields. As I continued looking out for more birds I discovered that there were many kingfishers! Excited as I was, I took a picture of the kingfisher that set me off to a good start. There were several cattle egrets wandering on the fields, a few of them riding on the buffaloes. I even spotted jungle babblers and a goshawk (state bird of Punjab). Just as I was about to leave, I spotted a coucal in front of our car. The bird is said to bring luck and it might even be true because what I saw next was nothing in comparison to anything I had previously seen. None could compare to the doubled happiness I received on seeing the majestic hoopoe (Israel's national bird) perched on a tree in all its splendour. My journey lead me to Taran Tarn Sahib Gurudwara. It was truly a wonderful day that found a permanent place in my long term memory. I would encourage everyone to be a birder and to be party to the brilliant sights of these magnificent creatures lost in a world of their own.

-Harleen Kaur Johal (3rd yr. CZE)

Crossword

Across

1. City at risk of submersion due to rising sea levels.
2. Company that has recently developed solar roofs.
3. Forms 4-9% of greenhouse gases.
4. Country which plans to shut down all coal plants by 2023.
5. Country which has 100% of it's electricity powered by renewable energy like hydroelectric and geothermal energy.

Down

6. The city with the highest level of particulate matter polluting it's air.
7. Carbon negative country.
8. Replaces cement as a more eco friendly construction material created with recycled fly ash.
9. Country which plans to be fossil fuel free by 2030.
10. Country which has the highest cumulative release of carbon dioxide over the last hundred years.

Answers:

1. Mumbai, 2. Tesla, 3. Methane, 4. France, 5. Iceland, 6. Delhi, 7. Bhutan, 8. Ashcrete
9. Sweden, 10. USA

Anandi S.N. (1st yr. CZE)



"Just like the lotus, we too have the ability to rise from the mud, bloom out of the darkness and radiate into the world."

Mahima Purushotham (2nd yr. CZE)

build the steel flyover from Basaveshwara Circle to Hebbal flyover with connecting ramps on Race course Road, Palace Road, Vidhana Soudha Road and Raj Bhavan road. The project envisaged a 6.7 Km stretch of a six-lane flyover that would save 7- 15 minutes of travel time. However the same project would lead to the loss of 812 trees. Recent modifications to this project show that there would be an estimated loss of around 2000 trees, due to the proposed further extension of the flyover. Several trees in different stretches have already been cut despite ongoing protests from the citizens concerned for Bengaluru's diminishing tree cover.

Neralu - Bengaluru's Tree Festival

The students of the eco club volunteered and participated in various aspects of the festival such as the tree walks, the various workshops and other activities of the festival. The tree walks were spread across 15 different locations in Bengaluru and students took part in the different walks. It was an educational experience that was meant to inspire the students of the eco club. The students enjoyed the experience and were very enthusiastic. They were made aware of the surrounding flora and fauna that is often ignored in the hustle of the busy city life. They were enlightened on the urban wildlife and were made to appreciate the city's rich heritage of greenery.

Vasathnagar E- Waste Awareness and Collection Drive

The Eco club organized an 'E-waste awareness and collection drive' in Vasanthnagar. The aim of the drive was to bring about awareness on E- waste and the dangers of mixing e-waste along with other waste. The students went house to house to spread awareness and collected e-waste from several locations. The waste collected included old batteries, CD's, wires, old electrical gadgets etc. The students had a different experience interacting with citizens and got a taste of the challenges faced while spreading awareness.

-Sherin S. George
(3rd yr. CZE)

Secretary, Environmental
Science Association &
ECO Club





The Stunning Diversity of Yellowstone National Park

Yellowstone National Park spreads over the states of Montana, Wyoming and Idaho in the USA. It is well known for being a biodiversity hotspot despite the harsh climatic conditions of the area. Some of the most stunning sights this park has to offer, are of course those of the vibrantly coloured hot springs. Don't let the rainbows stretching forth on the ground ahead, fool you though. Many of these hot springs are highly acidic, sending gusts of steam and hydrogen sulphide floating across the terrain. Thankfully the steam cools and condenses quickly in the snow filled, icy mountains so spectators are not harmed, aside from being occasionally enveloped by the foul smell of rotten eggs.

I however, was most intrigued by the colours of all the micro-organisms that thrive in these springs. These thermophiles manage to survive in temperatures ranging from 30-100° C, with very little organic matter and variable pH. The rainbow rings of the springs like 'The Grand Prismatic' are due to the different types of microbes occupying the area surrounding the spring in concentric rings. These zones are classified based on their temperature, which in turn determine the types of bacteria they are capable of supporting. The innermost ring is called the high temperature zone with temperatures of 73°C and above. The microbes here are non-photosynthetic and considerably

less in number compared to the other rings. The next zone is the Synechoccus and Chloroflexus zone with temperatures between 60-73°C. These cyanophytes are responsible for creating the vibrant yellow, orange and greens-blue biofilms on the surfaces in contact with water. The Phormidium zone, with temperatures between 30-60°C supports filamentous cyanobacteria which form rubbery sheets and terrace pools. The shallow Calothrix zone with temperatures of 30°C and below have bacterial filaments coated with silica, which makes them stronger and more resilient than the networks of the phormidium zone.

Aside from experiencing the geysers and hot springs of yellowstone in all their glory, I also had the privilege of witnessing the communities of larger animals that Yellowstone supports. The most common are the bison, rams and antlered deer which can be found roaming the chilly areas of the mountain ledges, coexisting in perfect harmony. We even saw the odd coyote footprint the cooler fringes of the hot springs and were later rewarded with the sight of a pregnant coyote hunting for rodent prey in the snow. All in all, Yellowstone Park is quite the paradox with hot springs and snow existing side by side. It is this very paradox that captures our interest. After all, it isn't everyday one sees a bear trotting past at such a close range.

-Anandi S.N. (1st yr. CZE)

Editorial Team

Sherin Shiny George, Archana Devarapalli & Anandi S. N.

Faculty Advisors

Dr. Helen Roselene & Ms. Ranjini Ramesh

Department of Environmental Science, Mount Carmel College

No. 58, Palace Road, Vasanthnagar, Bengaluru - 560 052, Karnataka

Phone : +91 80 22261759, Fax : +91 80 22266386, Email : mounts@bgt.vsnl.net.in, Website : www.mountcarmelcollegeblr.co.in