SUMMER SCIENCE CAMP FOR STUDENTS OF RURAL UPPER PRIMARY SCHOOLS

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REGIONAL INSTITUTE OF EDUCATION
(NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING, NEW DELHI)
Mysore – 570 006

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PAC REPORT IP 06

Session-wise Reports 2011-12

ACKNOWLEDGEMENTS

I wish to thank the Principal, Professor Premlata Sharma, RIE, Mysore for all facilities and funds provided for the conduction of the Science Camp.

My thanks are also due to –

a) Head Masters and Teachers of all participant local schools for showing keenness in participation of the camp.

b) Dr. B.S. Upadhyaya, Head, DEE and all the Staff of DEE for all assistance rendered towards the smooth conduction of this annual camp and preliminary typing of the report.

c) Dr. G.R.Prakash, Associate Professor in Chemistry, for all assistance rendered throughout.

d) All the esteemed and distinguished resource persons who helped make the science camp a success; and to Dr. JBRaj, Lecturer (ad hoc), Physics Department for discussions on Science Park.

e) Dr. Gowramma, Lecturer, DEE for accompanying me on the field visits to local schools.

f) Dr. Lancy D'Souza, Professor of Psychology, Maharaja's College for helping with statistical analysis and evaluation of the needs and impact of Science Camp.

g) Mr. Praveen Kumar, Softouch, Saraswathipuram, Mysore for making an excellent work of finalizing and binding this report.

Geetha Nair 15/03/12

Dr. (Ms) Geetha G. Nair
Associate Professor in Botany&
Programme Co-ordinator

PREFACE

The Regional Institute of Education has been conducting summer science camps for students continuously for the last 4-5 years. This camp titled "Science Camp for Schools 2010-2011" is the 6th in the series. The summer science camp was conducted in September 2011 due to the inability of the rural schools to send the students in the summer month of May because of certain unforeseen and unexpected circumstances and their official commitments elsewhere. This particular camp is the sixth in the series and was held during the Dasara holidays for the students of Karnataka in general. It commenced on 28th of September 2011 (1st day of Dasara Celebration and concluded on the 4th of October 2011 (2 days prior to Vijayadashami).

The purpose of this camp was to awaken scientific interest in the students and to arouse their natural curiosity towards living things, non-living things, processes and phenomena in and around them. It was to create/ develop an attitude for science (inculcating skills of logical thinking, reasoning, analysis, problem solving, self-awareness and understanding of inter-relationships in nature) and to make study of scientific concepts a joyful affair.

Topics relevant to day to day encounters and experiences of 6th, 7th and 8th standard students were selected and projected in front of the student audience in the form of computer games, movies, activities, experiments, short projects with hands-on experience, discussions, debates and visits to places of scientific interest. Resource persons from institutes of prominence from in and around Mysore were the centrefigures of all activities during the Science Camp.

An effort has been made herein to summarise the goings on of the camp which we hope will be beneficial to the students (especially rural) who come from areas where there is little access to infrastructural materials and resource materials for the teaching learning process of the human brain. The proceedings of each session of the camp have been summarized giving one a glimpse of the content transacted. Activities also have been highlighted and explained in brief. Assessment of the outcome has been done using questionnaire tools.

Competitions in model-making, essay-writing and debates and quizzes were arranged and prizes and certificates were given away at the valedictory function on the last day of the Science Camp by the Principal of RIE.

This report is expected to serve the dual purpose of highlighting the proceedings of the camp as well as being utilized as a resource/hand book for teaching science in rural schools.

Dr. (Ms.) Geetha G. Nair
Associate Professor in Botany &
Programme Coordinator, RIEM

ಮೈಸೂರು-ಚಾಮರಾಜನಗರ ಜಿಲ್ಲಾ ಸಹಕಾರಿ ಹಾಲು ಉತ್ಪಾದಕರ ಸಂಘಗಳ ಒಕ್ಕೂಟ ನಿಯಮಿತ..

MYSORE-CHAMRAJANAGAR DISTRICT CO-OPERATIVE MILK PRODUCERS SOCIETIES UNIONLTD,
ISO 9001-2008 CERTIFIED DAIRY

No: 2116 **Om Sri Gurubhyo Namaha**

HAPPY	MOMENTS	—	PRAISE GOD
DIFFICULT	MOMENTS	—	SEEK GOD
QUIET	MOMENTS	—	WORSHIP GOD
PAINFUL	MOMENTS	—	TRUST GOD
EVERY	MOMENTS	—	THANK GOD

DATE : 04/10/2011

Respected Dr. Geetha G.Nair

It was an amazing experience to associate with you and your faculties, staff to conduct 998th "AWARENESS ABOUT MILK AND HEALTH FORMULA" programme for your students on 01/10/2011.

Your esteemed co-operation with interest and affection to organise the programme was the best reason to turn out the programme most meaningful and successful. I strongly believe that the subjects discussed in the programme was more benefited to your students in their future endevours and maintaining their good health. **The very very much active participation from all of you with good interactions and eagerness to know more about milk and health, in the programme is highly appreciated and well remembered.** My personal hearty regards to all of you. My special prayers to LORD to bless all of you with bright future and divine prosperity and your students who are the future citizens to shape OUR PRIDE AND GREAT INDIA.

I on behalf of my organization and team members extend heart felt THANKS to your kindself, all faculties and participant students for the great honour and fullest co-operation WITH GOOD HOSPITALITY extended to my team WITH GOOD ARRANGEMENTS AND FOR EXPRESSING EXCELLENT OPENION ON "NANDINI MILK AND MILK PRODUCTS".

WITH REGARDS AND GOOD THOUGHTS

Yours truly,

(DR.V.V.KUMAR)
MANAGER
04/10/11

TRY NOT TO BECOME A MAN OF SUCCESS, BUT RATHER TO BECOME A MAN OF VALUE

'ನಂದಿನಿ ಎಂಬ ಸಜ್ಜನ ವೃದ್ಧಿಗೆ.ವಿಶ್ವಾಸವೇ ಬೇರುಗಳು, ಗುಣಗಳೇ ಹಣ್ಣುಗಳು,
ವಿನಯವೇ ಕೊಂಬುಗಳು, ನಂಬಿಕೆಯೇ ಎಲೆಗಳು,
ಗ್ರಾಹಕರೆಂಬ ಪಕ್ಷಿಗಳು ಆಶ್ರಯಿಸಿ ಸಂತೋಷಿಸುತ್ತವೆ.

TO, DR.GEETHA G. NAIR , Assoc Prof IN BOTANY
REGIONAL INSTITUTION OF EDUCATION MYSORE 570008

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Phone: 0821-2479411, 2473933,2473645 FAX:0821-2472797, email:mismymul@gmail.com

Schedule for Summer Science Camp for students of Rural Upper Primary Schools of Karnataka (28/09/11 to 04/10/11)

Date & Day	9.30 a.m. to 10.45 a.m.		11.00 a.m. to 1.00 p.m.		2.00 p.m. to 3.00 p.m.		3.15 p.m. to 4.00 p.m.
28-9-11 Wednesday	Inauguration by Principal	TEA BREAK	Race to save the planet **Mr. Johnsheen**	LUNCH BREAK	Biology Experiments /activities **Ms. Mohini**	TEA BREAK	Biology Experiments /activities **Ms. Mohini**
29-9-11 Thursday	Clay Modeling **Dr. Raghavendra (CAVA)**		Models in Science **Mr. Chandrashekaraiah**		Visit to Zoo **Dr Tangpu**		Visit to Zoo **Dr Tangpu**
30-9-11 Friday	Mental Health Problems in children **Prof. Ramaa**		Bio- diversity **Dr. S N Hegde**		Plastination **Dr. Shyam Sunder**		Plastination **Dr. Shyam Sunder**
1-10-11 Saturday	Bird watching **Dr Sadanand**		Chemistry Experiments & Activities **Mr A Nagaraj**		Nutrition and Health V/s Milk **Ms. Mohana Lakshmi N**		Nutrition and Health V/s Milk **Ms. Mohana Lakshmi N**
2-10-11 Sunday	Mathematical Brain Teasers - **Mr. B S Krishna Murthy**		Mathematical Brain Teasers - **Mr. B S Krishna Murthy**		You & Heredity **Prof. Srikantappa**		You & Heredity **Prof. Srikantappa**
3-10-11 Monday	Visit to Dairy **Dr Geetha G Nair**		Visit to Dairy **Dr Geetha G Nair**		Polymers and Biomedicals by **Dr.Rajesh**		Polymers and Biomedicals by **Dr.Rajesh**
4-10-11 Tuesday	Analysis of water and Ecological Studies **Dr A Sukumar**		Computer Games & Net **Mr. Mahesh**		Debate/Visit to Science Park **Dr. Tangpu / Dr. GRP**		**Valedictory Function**

Essay Competition: Should the sun be painted Black ?

Geetha Gnair

Dr. Geetha G Nair
Programme Co-ordinator

LIST OF RESOURCE PERSONS

Regional Institute of Education, Mysore 570 006
Department of Extension Education

Title of the Programme: *Science Camp 2011-12*

Programme Co-Ordinator: **Dr Geetha G Nair** **Date/s** **28th Sept 2011 – 4th Octo 2011**

List of Resource Persons

Sl. No.	Name, Designation, Address	Signature
1	**Prof.Nagaraj** **Rtd. Professor** **13, 8th Main, 11th Cross, III Phase, Srirampur,** **Bangalore -560 085**	
2	**Dr L Srikantappa** **Professor (Rtd.)** **# 6, Gangothri Layout , II Stage, Saraswathipuram** **Mysore**	
3	**Dr N Rajesh** **Asst.Professor & Head** **# 3481/1-L-44, Behind Church Road** **Lashkar Mohalla** **Mysore 570 001**	
4	**Mrs Mohini** **TGT (Rtd.)** **1092, DP Road** **Chamarajapuram** **Mysore- 570 005**	
5	**K Raghavendra** **Lecturer** **H O D , Department of Sculpture** **C A V A** **Mysore – 570 001**	
6	**K B Sadanand** **Deputy Editor** **Kannada Encyclopedia (Rtd.)** **11, Temple Road** **Jayalakshmipuram** **Mysore – 570 012**	

7	Ms.Mohana Lakshmi A P Consultant Mysore – Chamarajanagar Milk Co-operative Society Siddhartha Layout Mysore – 570 011	
8	B S Krishna Murthy Faculty AIM I T EWS 304, I Stage K H B Kuvempunagar Mysore – 570 023	
9	Dr S N Hegde Professor & Chairman Dept of Studies in Zoology Manasagangotri Mysore	
10	Dr N M Shama Sundar Professor & Head (Anatomy) J S S Medical College MYSORE- 570 015	
11	Mr. Mahesh NIIT LAB RIE, Mysore	

INTERNAL RESOURCE PERSONS

Sl. No.	Name, Designation and Address	Signature
1	Dr. S. Ramaa Professor of Education RIE Mysore	
2	Dr. G. R Prakash Associate Professor in Chemistry DESM, RIE Mysore	
3	Dr. A Sukumar Associate Professor in Zoology DESM, RIE Mysore	
4	Dr. V. Tangpu Assistant Professor In Zoology, DESM, RIE Mysore	
5	Dr. Geetha G Nair Associate Professor in Botany DESM, RIE Mysore	
6	Mr. John Sheen AV Studio, RIE Mysore	

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Day – 1
28th September, 2011

Sessions I& II
9.00 a.m. – 1.00 p.m.
***

INAUGURAL

Professor Premlata Sharma, Principal, RIE, Mysore inaugurated the Science Camp. She enlightened the students on the advantages of learning Science and suggested activities for the Science Camp including topics for debate and essay competition. Students were encouraged to question and mingle freely with the resource persons.

Fig. 1 : Principal RIE, Prof. Premalatha Sharma, Head DEE Dr. B.S. Upadhaya and Dr. Geetha G. Nair, Programme Co-ordinator at the inaugural function.

RACE TO SAVE THE PLANET

***RP: Mr John Sheen & Dr Geetha G Nair**

We live in a technological and digital phase of scientific development and are on the move ahead to an age where man has no time to see or look back and judge as to what he has left for posterity. Man is like a child today using science and technology to constantly tamper with nature ; and he is out to conquer space little realizing the extent of damage he has left behind. This movie projects the results of man's activities on earth.

1. Depletion of natural resources and food through felling, cutting, hunting, living, construction of concrete buildings, industries, unplanned dumping of waste in water bodies; use of automobiles; nuclear explosions, construction of nuclear plants etc.
2. Depletion of Ozone (O_3) layer and letting the harmful UV rays enter the atmosphere there by causing skin diseases, especially cancer and other concomitant physiological and medical problems.
3. Population explosion due to increase in life expectancy.
4. Race to save the planet – is a ten-part series addressing the world's environmental crises. It is designed as an educational tool. It is a call to action, a siren to alert society to the urgency of the world's environmental situation. If we watch and heed its message we will indeed have a part in this awakening. The airing of this series is a breakthrough in promoting environmental awareness. And therefore was shown to the students here.

<u>The first episode</u> "The environmental Revolution", traces the development of humanity from prehistoric man to present day. For thousands of years, humans were a nomadic species and relied upon the environment for survival. The advent of agriculture in the last 10,000 years, and the Industrial Revolution, changed humanity's perspective towards the environment.

<u>Next episode (episode two)</u> "Only one atmosphere," explores the impact of Industrial revolution upon the atmosphere through global warming and ozone depletion.

*** Resource Person**

Episode three examines the impact of contemporary affluence upon the environment. "Do we really want to live this way?" profiles Los Angeles and the Rhine River in Europe.

The fourth episode "In the name of progress," shows the impact of industrialization in India and Brazil. The episode examines both the negative and positive results of the development and the vivid photography leaves no question in the viewer's minds; both people and the environment get the short end of the stick.

The fifth episode "Remnants of Eden" explores the loss of biological diversity, including genetic variations within each species. Humans have caused the demise of many species already.

The sixth episode deals with energy conservation and ways to improve energy efficiency and our current power sources. The episode "More for less" advocates moving away from conventional sources (such as fossil fuels) towards renewable sources like hydroelectric and solar power.

The seventh episode in the series, "Save the earth, feed the world," explores the possibilities and limitation currently available in agriculture. It advocates combining sound ecological practices with technology to produce the highest yield, without sacrificing the land.

Episode eight "Waste not, want not" deals with the problem of waste. More than half our cities are within five years of exhausting their landfills and alternatives need to be considered. It suggests ways to reduce, reuse, and recycle garbage so that it has the least impact upon the environment.

Episode nine explores three governments and their environmental policies. Viewers see how Zimbabwe, Thailand and Sweden include the environment in their domestic policies. "It needs Political occasions" and challenges the world's governments to take a strong stand environmentally.

The final episode focuses on the manner in which all levels of society are relating to the environment from the individual to the nation. "Now or never "dares all of us to reconsider our relationship to the natural world and rethink how the environment fits into our lives.

'Race to save the planet' is all about what Maurice Strong, Co-ordinator of the first World Environmental Conference, in 1972 explained – "The whole of human life is now in our hands, literally in the hands of our generation, because what we do or fail to do now is going to determine the degree to which human life is going to survive on this planet."

Day – 1
28th September, 2011

Sessions III & IV
2.00 p.m. – 4.00 p.m.
***

BIOLOGY EXPERIMENTS AND ACTIVITIES

RP: Ms. Mohini

A number of experiments in Biology were conducted in the lab class and these included

1) Making paper-cuttings or paper models (coloured) of androecium, gynoecium, calyx and corolla and the whole flower. Entire fresh flowers were dissected and different parts studied; and
2) Testing for the presence of starch in potato, bread, egg, albumen, green gram, rice and onion using iodine. Starch turns blue in presence of Iodine. It was concluded that starch is not present in onion and bread by testing all the materials with Iodine.

Table – 1 : Biology Experiments

Sl. No.	Expt	Observation	Results/ Inference
1.	Potato + Iodine Solution	Potato turns Bluish Black in color	Starch is present
2.	Bread + Iodine Solution	Bread turns Bluish Black in color	Starch is present
3.	Egg albumen + Iodine Solution	Egg albumen does not turn bluish black	Starch is absent
4.	Cooked green gram + Iodine Solution	Green gram turns bluish black	Starch is present
5.	Cooked rice + Iodine Solution	Rice turns bluish black	Starch is present
6.	Onion + Iodine Solution	Onion does not turn bluish black	Starch is absent

Day – 2
29th September, 2011

Session I
9.30 a.m. – 10.45 a.m.

***

CLAY MODELING

RP: Dr. Raghavendra (CAVA)

The students were enlightened about the uses of clay. There are different types of soils available on the surface of earth viz., sand, loan, clay and gravel etc. These vary from each other in the particle size of soil and their ability to retain capillary water.

Clay is irresistible. Pick up a cool piece of clay and squoosh and squeeze it. Let it ooze between your fingers or roll it around on the palm of your hand. Play-Don or modeling clay can be molded and shaped, stays soft is easy to work with and can be used over and over again. Clays are available that can set-up and harden with out heat and can be used for sculptures such as Model-magic or Makin's clay. There are clays made of polymer with such brand names as Sculpy and Fim, that are a little tougher to manipulate but they can be shaped into finely detailed items that once baked will keep their shapes for ever.

All you really need is your own two hands and a bit of creativity to work with clay but sometimes a few simple tools can add a lot inspiration. You can buy several fancy tools to work with clay. You can also use things you have "lying around the house". Any thing that catches your eye like bottle caps, button, crochet needle, straws, jar lid, pencils, plastic utensils, scissors and tooth picks are tools to be ready with.

There are different brands and types of clay as per the description here

Crayola Model Magic Clay

It is a long lasting, pliable modeling material, that can be air-dried and then can be painted or decorated.

Makin's Clay

It is a no bake, bendable, paintable clay that bonds to surfaces and is non-toxic.

Paper Clay

This is non-toxic and can be sculpted, molded or shaped and air-dried to a hard finish.

Polymer Clay

This is man made, does not dry out, bakes in your house oven at a fairly low temperature to a hard often pliable surface that can be painted or decorated.

Eraser Clay

This is oven baked clay that becomes an eraser after baking.

Polymer Clay is man-made, does not dry, bakes in home oven at low temperatures to a hard often pliable surface that can be painted and decorated.

Eraser Clay is oven-baked clay that becomes an eraser after baking

Terracotta - is Baked sand and Serrakota is polished Clay Special clay when placed in oven and hardened gives special items called 'Ceramics'.

Two types of clay processes are used for clay modeling – plate clay modeling and coil modeling.

Frames, motifs, ganeshas, pen stands and tortoises were made using clay.

Clay modeling is a psychosocial medium for bringing in mastery over the trauma of tsunami - The tragedy of 2004 that left children confused, shocked and frightened. Other psychosocial mediums were drawing dolls, clay modeling, story telling etc. The mediums were play oriented and non-threatening for children to ventilate their repressed memories. It helps them recover their sense of well-being and normalizes their daily life routines and emotional reactions. It enables them to express themselves in a safe and accepting environment and helps them re-establish their sense of health and well-being. Clay can facilitate both cognitive and affective development of the child. Clay is supple has weight and texture and a smell that children often love. It responds to them by changing its form, engaging them in a sort of tactile conversation. Manipulating clay helps a child develop fine motor skills and is often used in pre-school classes. Infact clay has been used by psychologists in many instances for the therapy of disturbed children. Those who are visually impaired can also use it successfully. Children are encouraged actively to manipulate the clay at times even with aggression.

Day – 2

29th September, 2011

Session II

11.00 a.m. – 1.00 p.m.

***

MODELS IN SCIENCE

RP: Mr. Chandrashekaraiah

The study of science is based on analysis, logic and reasoning, Scientific studies necessitate the presence of a hypothesis followed by proof or evidence as well and that is where models become useful. To understand concepts and theories of Science, models are essential.

The working models used in the summer camp were prepared using low cost materials. In addition, certain activity based teaching was undertaken to develop some of the concepts. Some of the following areas were dealt with using the above materials like springs, papers, alcohol, enamel, paint, etc.

1. Weights and Measurements
2. Transfer and Energy etc.
3. Combustion of fuels
4. Reflection and Refraction of light etc.

Day – 2
29th September, 2011

Sessions III & IV
2.00 p.m. – 4.00 p.m.

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VISIT TO ZOO

RP : Dr V Tangpu

A variety of animals were observed living, feeding and moving in their natural habitats in the zoo as follows:

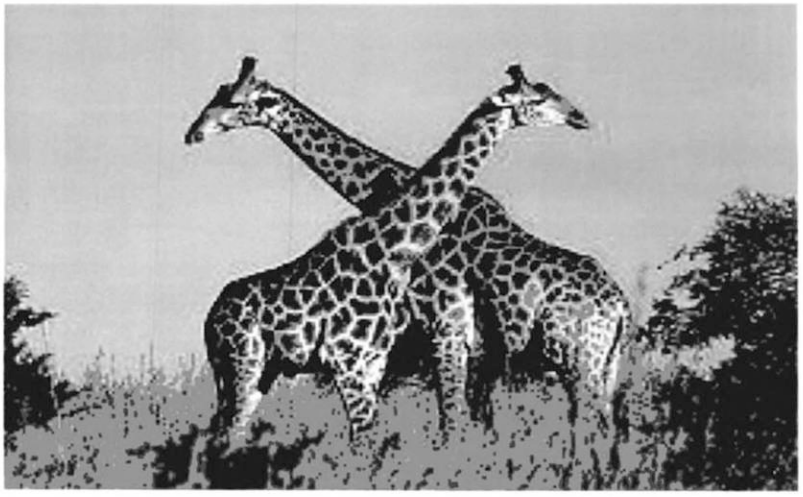

Fig. 2 : Giraffe – *Giraffa camelopardalis*

Fig. 3 : Parrots - *Tanyganthus megalorynchos*

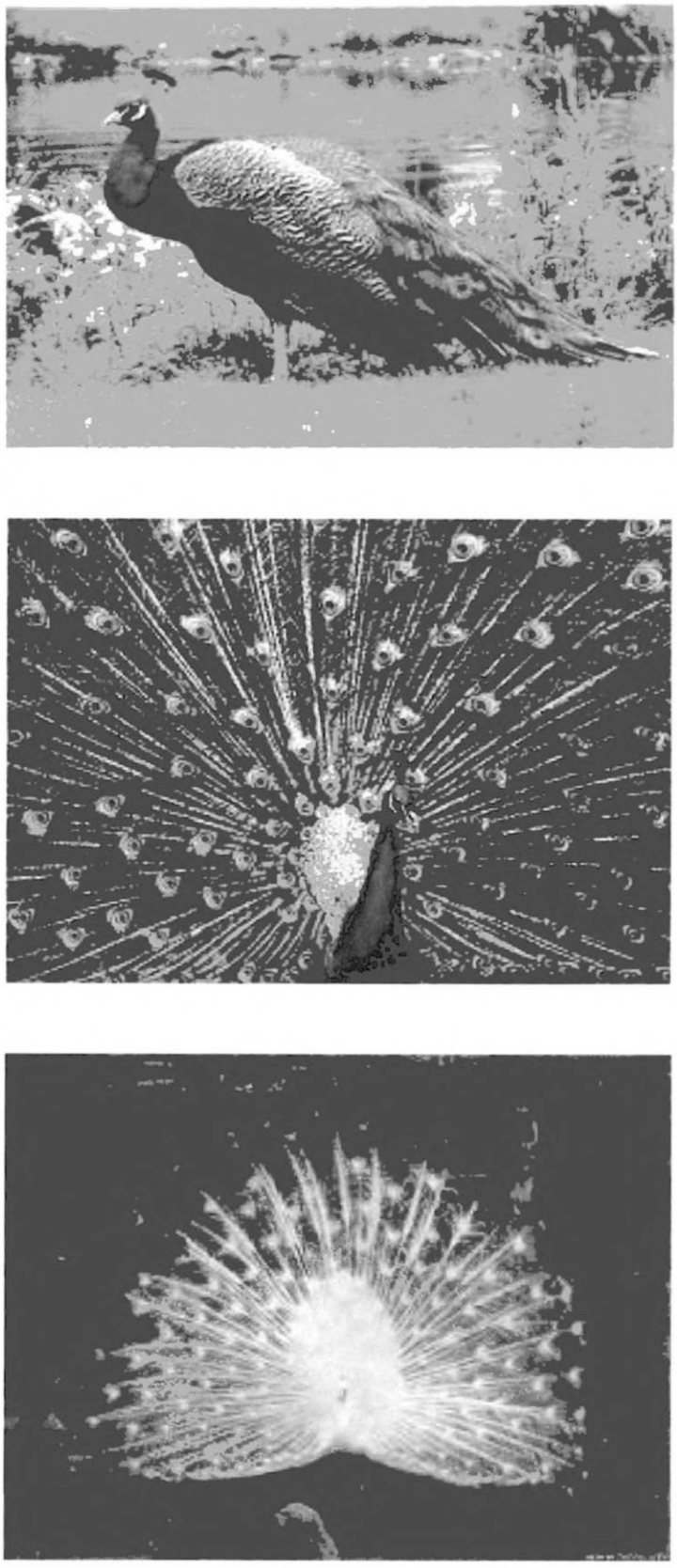

Fig. 4 : White peacock – *Pavo cristatus*

Fig. 5 : Tiger and White tiger – *Panthera tigris* (normal and white)

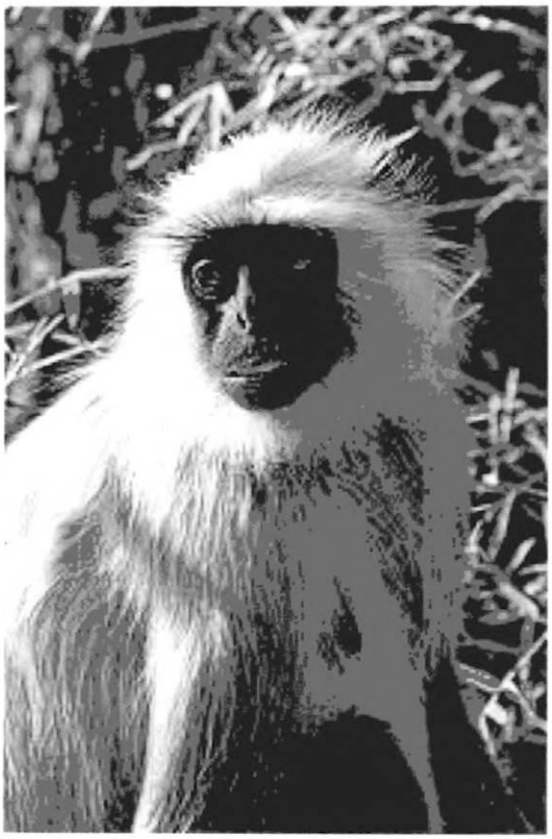

Fig. 6 : Langur – ***Trachypithecus francoisi***

Fig. 7 : Gorilla – ***Gorilla gorilla***

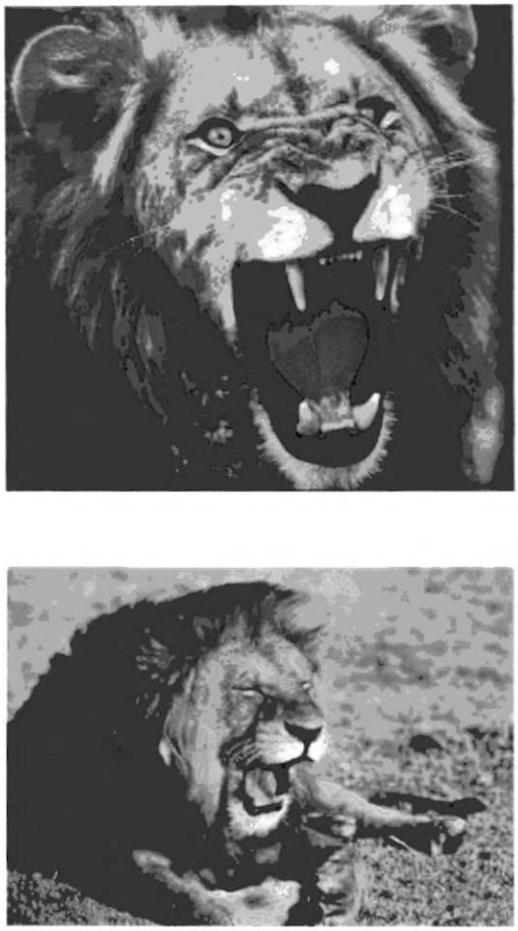

Fig. 8 : Lion – *Panthera leo*

Fgi. 9 : Rhinoceros (Black) – *Diceros bicornis*

Fig. 10 : Seahorse – *Hippocampus hystrix*

Fig. 11 : Deer – *Muntiacus muntjac*

Fig. 12 : Indian Elephant – *Elephas maximas indicus*

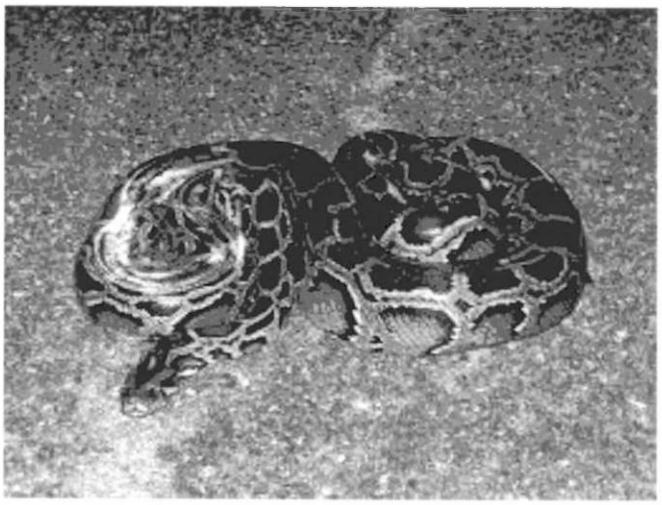

Fig. 13 : Python – *Antaresia stimsonii*

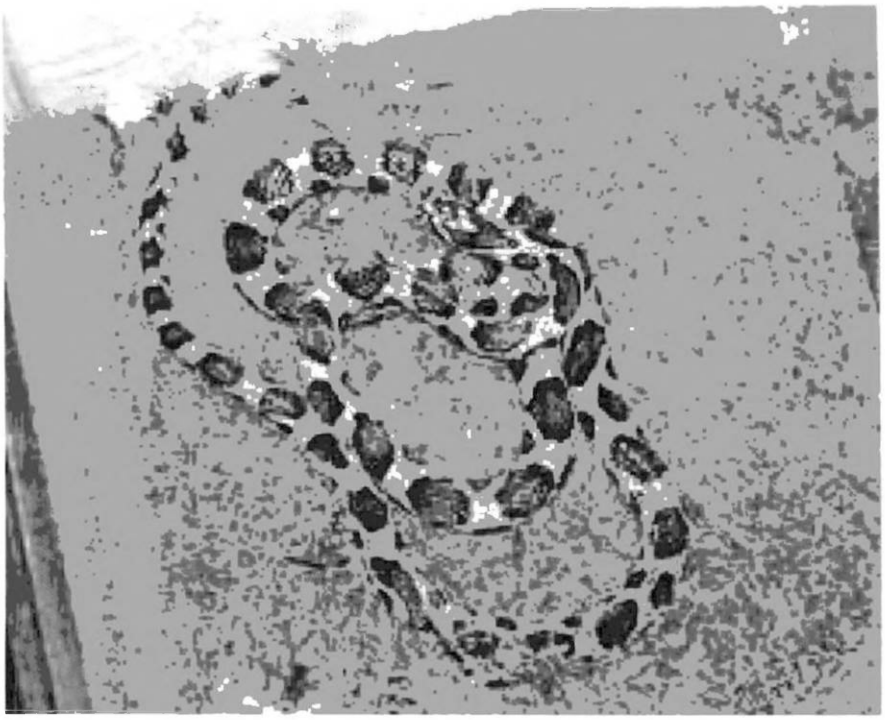

Fig. 14 : Rat snake – *Elaphe spp.*

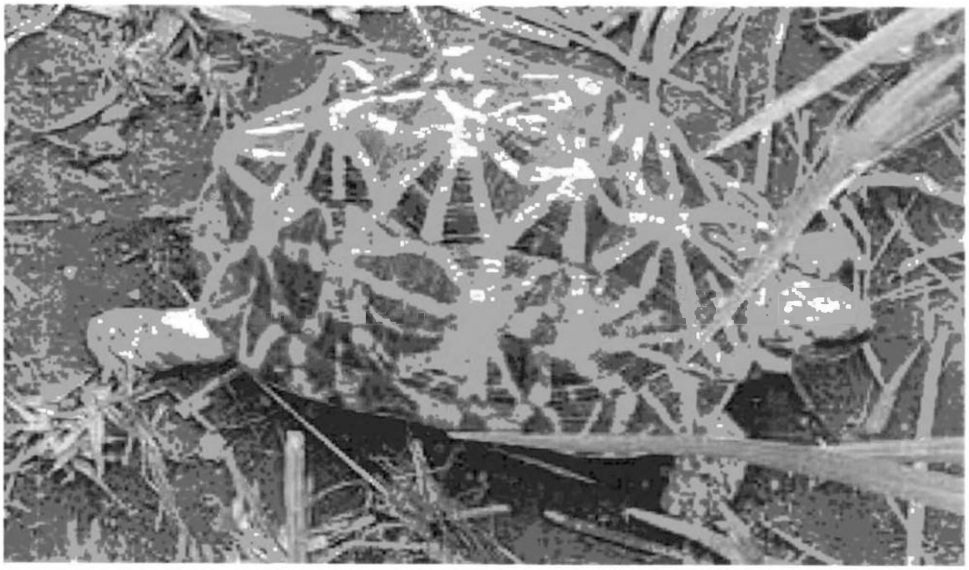

Fig. 15 : Tortoise – *Geochelone elegans*

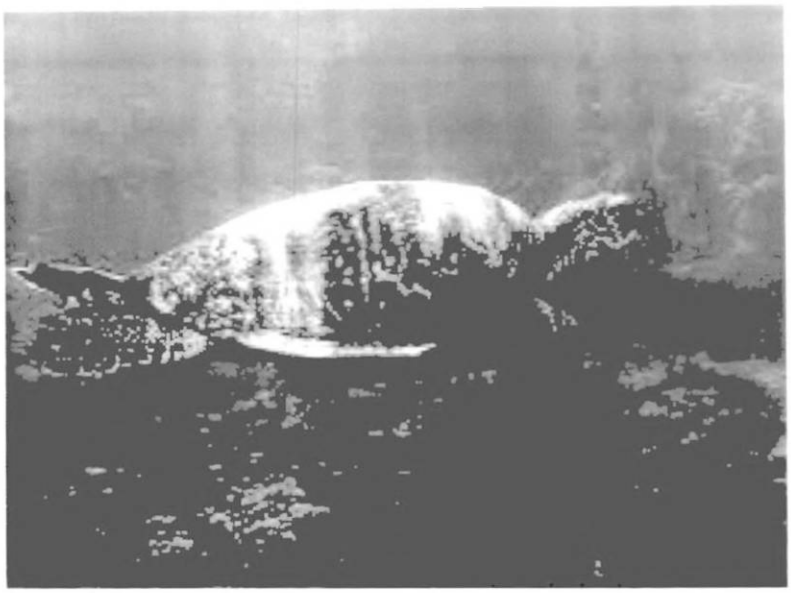

Fig. 16 : Turtles – *Actinemys marmorata*

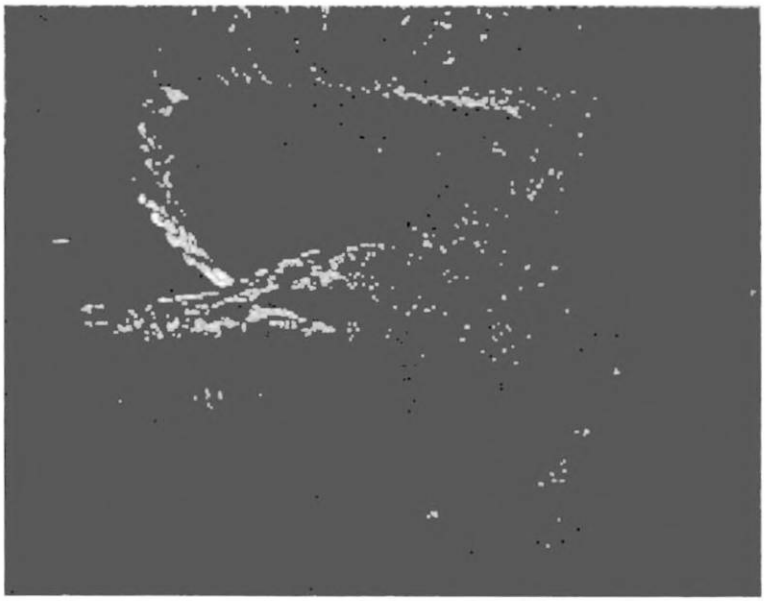

Fig. 17 : Crocodiles – *Crocodylus niloticus*

N.B.: Author's names have been left out for the purpose of simplification.

Day – 3
30th September, 2011

Session I
9.30 a.m. – 10.45 a.m.

***

MENTAL HEALTH PROBLEMS IN CHILDREN

RP: Prof. S.Ramaa

During the course of the session, the students were apprised about the day to day problems one faces in the daily grind of life and how to encounter them. These were taken at a minutissimal level and discussed.

The following questions were asked and answers / responses elicited to gauge the extent of psychological difficulties in students

1.	Do you enjoy life to the fullest?	Y/N
2.	Do you waste time by worrying?	Y/N
3.	Do you love yourself?	Y/N
4.	Do you find peace with in your own self?	Y/N
5.	Do you laugh a lot?	Y/N
6.	Do you find humour in most situations?	Y/N
7.	Do you look for solutions for a problem?	Y/N
8.	Do you complain a lot?	Y/N
9.	Do you take enough interest in your own self?	Y/N
10.	Do you have a strong set of values?	Y/N
11.	Do you feel good about yourselves?	Y/N
12.	Do you become overwhelmed by emotions like love, anger, fear, guilt and anxiety?	Y/N
13.	Do you lose friends after you make them?	Y/N
14.	Do you feel comfortable with other people?	Y/N
15.	Do you laugh at yourselves with others?	Y/N
16.	Do you laugh at others?	Y/N
17.	Do you have respect for yourselves and others along with your differences?	Y/N
18.	Do you accept the difficulties of life?	Y/N
19.	Do you calmly meet the demands of life?	Y/N
20.	Do you face problems of life?	Y/N
21.	Do you take your own decisions?	Y/N
22.	Do you shape the environment if you can?	Y/N
23.	Are you shy, fearful, anxious or deluded?	Y/N
24.	Do you adjust if necessary?	Y/N

It was concluded that several students show characteristics of maladjustment and these symptomatic features were enlisted as follows:

1. Withdrawn
2. Timid
3. Shy
4. Self – conscious
5. Anxious
6. Deluded
7. Aggressive
8. Tense
9. Ambitious
10. Feelings of Inferiority
11. Emotionally disturbed
12. Isolated and unsociable
13. Sensitive
14. Short – tempered.

The session was aimed at enabling the students to monitor their own selves as **"Little Doctors"** and correct themselves.

Day – 3

30th September, 2011

Session II

11.00 a.m. – 1.00 p.m.

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BIODIVERSITY (PLANT AND ANIMAL)

RP : Prof. S N Hegde

Bio-diversity can be defined as the degree of variation of life forms within a given ecosystem, biome or an entire planet. Tropical regions are rich in bio-diversity whereas polar regions are poor.

1. Mass extinctions or losses in bio-diversity are caused by rapid environmental changes and less than one percent of extant species on earth are extinct. This also leads to loss in genetic diversity. Bio-diversity impacts human health positively as well as negatively.

   The UN has designated 2011-2020 as the United Nation Decade on Bio-diversity.
2. Massive growth in human population through the 20^{th} century has had more impact on bio-diversity than any other
3. Deforestation and introduction of new and invasive species also destroy biodiversity
4. Bio-diversity provides initial support for drug discovery and the availability of medicinal plan reserves. Fifty percent of the pharmaceutical compounds on the US market are derived from plants, animals and micro-organisms while about 80% of the world population depends on medicines from nature.
5. Overhunting, logging, soil conservation and illegal wild life trade form the single largest threat to bio-diversity in Asia
6. Biodiversity has intrinsic aesthetic and spiritual value to mankind, Bio-diversity is also important to the security of resources such as water, timber, paper, fiber and food. Therefore loss of biodiversity is a significant risk factor in business development and a threat to long term economic sustainability.
7. Biodiversity enriches leisure captivities such as hiking, bird watching or natural history study.
8. Gardening, fishkeeping and specimen collecting depend on bio-diversity
9. Biodiversity plays an important part in regulating the chemistry of our atmosphere, water supply, water purification, recycling nutrients and providing fertile soils. Biodiversity has economic value.

Biodiversity as measured by the members of plant and vertebrate species is greatest in the Western Ghats and the Northeast. Threats to species are principally due to a decline in the areas of their habitats, fragmentation of habitats and decline in habitat quality, and fragmentation raises the extinction risk.

Biodiversity is under threat worldwide. For examples the global mammalian extinction rate of 0.35% of species lost per century since 1,600 is calculated to be between 17 and 377 times the mammalian background extinction rate during the past 65 million years, that is, since the mass extinction that removed the dinosaurs

Table – 2 : Global Bio-diversity

	Indian spp (%)	Threatened spp (%)	No. extinct
Animals	356 (7%)	41%	4(1.8%)
Birds	1219 (12%)	7%	Unknown
Reptiles	495	46%	Unknown
Amphibian	207 (4%)	57%	Unknown
Freshwater fish	700	70%	Unknown

From the standpoint of biodiversity India is given the status of a mega-diversity zone. There are ten biogeographic zones which are distinguished clearly in 'India' from the standpoint of bio-diversity. India is given the status of 'a mega-diversity' zone.

1. Trans Himalayan zone: Northern most area around Himalayas with irregular vegetation has richest wild sheep producing quality wool. It has not only quality sheep but also goat community which is superior in the world.
   Migratory birds such as the blue black neck crane and the endangered great Indian Bustard are seen here.
2. Himalayan zone : maximum biodiversity and national parks
3. Desert zone: part of Rajasthan state – a deserted zone.
4. Semiarid zone: starts in Rajasthan ground water and surface water is much less. Dry xerophytic vegetation is predominant, fauna is also minimum very few orchids and bamboo and other plants are seen
5. Western Ghats: mountainous Western zone of south peninsular India having rich flora and fauna with tropical rain forests extending from Konkan region of Maharashtra upto the Western part of Kerala, generally called Malabar coast of Arabian sea. Wild relatives of cultivated plants like banana, mango, citrus, black pepper are found abundantly in this part.
6. Deccan plateau zone – Central table land of South India with rich flora and fauna, but some areas represent semi arid type of vegetation.

Day – 3

30th September, 2011

Sessions III & IV

2.00 p.m. – 4.00 p.m.

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PLASTINATION

RP: Dr Shyam Sundar and Dr Rajesh

Plastination is a technique or process used in anatomy to preserve bodies or body parts. The water and fat are replaced by certain plastics, yielding specimen that can be touched, do not smell or decay and ever retain most properties of the original sample.

Why plastination?

1. The usual anatomy or pathology museums have the specimen in bottles. The formalin preserved wet organs, dissection specimen have their own drawbacks. Handling the formalin preserved specimen has an important disadvantage of irritating order and bleached colourless parts, not giving a naturalistic idea. The sections are difficult to maintain. The luminal architecture dimensions and branching patterns are almost impossible to imagine in a dissection. One of the new areas for synthetic is the preservation technique of Plastination is a technique of preparation of dry colored, nontoxic durable, odorless, natural looking specimen.
2. The different methods of plastination have promising solution for most of the problems. The objective of learning medicine is to help understand the normal human body and changes during the disease process. The size shape, consistency and relationships in a 3-dimensional orientation of different biological specimen should be understood and plastination is an area eliminating all the drawbacks of all the earlier preservation techniques.

The Process: There are 4 steps in the standard process of plastination-fixation, dehydration, forced impregnation in a vacuum and hardening. Water and lipid tissues are replaced by curable polymers. Curable polymers used by plastination include silicone epoxy and polyester co-polymer.

Step – 1 Fixation

The body is embalmed usually in a formaldehyde solution, in order to halt decomposition.

Step – 2

Dissection and dehydration – the specimen is placed in a bath of acetone. Under freezing conditions, the acetone draws out all the water and replaces it inside the cells.

Step – 3: Impregnation

The specimen is then placed in a bath of liquid polymer such as silicone rubber polyester or epoxy resin. By creating a vacuum, the acetone is made to boil at a low temperature. As the acetone vaporizes and leaves the cells, it draws the liquid polymer in behind it, leaving a cell filled with liquid plastic.

Step 4 : Curing

The plastic must then be cured with gas heat or ultraviolet light in order to harden it. A specimen can be anything from a full human body to a small piece of an animal organ and they are known as plastinates. Once plastinated, specimen and bodies can be manipulated and positioned.

All methods used for halting the decomposition of the body are plastination methods for eg., mummification, formalin, paraffin impregnation and cryopreservation. Other modern methods include (Silicone S10 standard Procedure) the cor-tech room temperature procedure, the epoxy E12 procedure, and the polyester P35 procedure.

Silicone S10 :

It is a procedure used for creating opaque natural looking specimen.

Cor-Tech Room temperature procedure

It is designed to allow plastination of specimen at room temp to various degrees of flexibility.

Epoxy E12 procedure

It is utilized for thin transparent and firm body and organ slices. Polyester P35 preserves semi-transparent and firm brain slices.

Methods: there are three methods of plastination

Methods

There are 3 methods of Plastination

1. Whole organ Plastination:
2. Sheet Plastination
3. Luminal cast Plastination

1. Whole Organ Plastination

By this technique, any part can be plastinated for the purposes of understanding the total structure and relationships. Compared to the preserved specimen, fresh ones give excellent results.

The specimen are washed with tap water to remove the dirt, blood, contents etc. Irrigation with mild detergent solution and washing with the dilute hydrogen peroxide cleans mucus, pus, blood in the blood vessels. After this immerse specimen in 5 times the volume of 10% Formalin or color retaining Special Plastination preservative containing –

95% Alcohol .....280 ml
Formalin .....120 ml
Glycerin .....80 ml
Phenol .....120 ml
Dist. Water .....800 ml

48 to 72 Hrs are needed to complete fixation. The Formalin is washed in running tap water for 12 to 24 Hrs. Now the specimen is transferred to jars containing (at least 10 times vol) of Acetone, at intervals of a few days to a few weeks, depending upon the size of specimen. Acetone also removes the fat. Completion of dehydration is assessed by measuring the S.G. of acetone which should remain at 0.89. Transfer the specimen to fresh acetone. If it does not turn yellow, it indicates total removal of fat. Now it is transferred to a jar of resin & left in it for 1 to 2 weeks. Finally the specimen is immersed in a mixture of resin (POLYPROPYLENE RESIN), catalyst (5%) & accelerator (0.1%). The specimen after a few hours becomes non-sticky. The specimen is mounted on a suitable base & properly oriented. Coloring can be done at any stage, to highlight specific parts or areas. The ***beautiful, colored, dry, odorless, non-toxic, durable, inexpensive, maintenance free, natural-looking, real specimen*** outbeat the routine specimen.

2. Sheet Plastination

This is a wonderful method of preparation of thin-transparent or thick-opaque body sections. The sheets are totally portable, the whole body being convertible into slices & stored dry. The inter-relationships are best appreciated by this technique & comparison with C.T. Scans & M.R.I.scans are possible.

Fresh parts (note that preservation is not at all necessary & colors are wonderfully maintained) are deep frozen for 24 hrs & thin- 3mm sections taken with a hand saw or preserved frozen parts are sectioned as 1cm slices. Further processing is similar to the classical plastination technique up to the stage of resin impregnation.

Thin Transparent Sections

The section has to be cast in the form of a sheet. This requires a double-glass chamber – Appropriate sized 3-4 mm (window pane) glass sheets are selected(sharp edges need to be ground to prevent injury during handling), cleaned and a sheet of same sized OHP transparency is kept on the glass sheet; a rubber tube (petrol pipe) with a stiff metal wire inside (to give a shape) is placed on the OHP sheet clad glass sheet; another glass sheet with OHP sheet covering is the next layer; now clips are put to the bottom and sides at intervals of 3 to 4 inches; this gets a glass chamber.

The two glass sheets (4mm thick) are separated by a rubber tubing of 6-8 mm diameter; clips hold the glass sheets together & make a leak proof chamber. The processed section is placed in the middle of the chamber, resin, catalyst (5%) & accelerator (0.01%) mixture is filled into the chamber slowly. After 12 hrs, clips are removed; glass sheets are carefully separated from the resin sheet; edges are trimmed, polished & the specimen is labeled.

Now the thin slice of processed organ (dehydrated, defatted & resin impregnated) is carefully placed in the center of the glass chamber; a thin transparent nylon wire is useful in properly orienting the specimen; a mixture of resin, catalyst & accelerator is carefully poured into the chamber, using a plastic (a used OHP sheet rolled & stapled) funnel; this is kept in the vertical position for a day.

Next day, the clips are removed one by one symmetrically, the glass sheets usually come apart or need a little separation if resin was sticking to them; the transparency sheets are carefully peeled off from one edge; the tubing has to be similarly separated from one end(it is worth to withhold one's curiosity if there is any doubt that it is till not totally solidified, another day of patient waiting is preferred, than losing a precious specimen); drying is done in heat and sunlight is not recommended. Edges can be finished using a grinding machine; labeled & stored in plastic covers or dust proof boxes.

Thick Sections

After resin impregnation, the section is immersed in a mixture of resin, catalyst & accelerator for a few hours, dried & stored in a clean cover.

Excellent Herbariums

Preservation of plant twigs in the Herbariums, has been the routine method, with its disadvantages of color change, shrinkage, fungal & pest infestation, and detachment of parts from the main stem. We have many a times wondered whether any alternative method, overcoming these problems can be thought of. ***Sheet Plastination*** appears to be the right answer .Carefully selected twig {remember – a permanent, not so expensive procedure, taking your precious time, needs a good specimen} of appropriate size, is cleaned of the dust, broken leaves etc and immersed for about 5 seconds in a cup of warm water ($<50^0$ C) to which a pinch of MgO has been added. This prevents chlorophyll degradation & retains the green color.

Now the twig is carefully pressed between two sheets of blotting paper to remove the water on the surface. It is immersed in wide mouthed bottle containing acetone, a dehydrating agent.

Meanwhile, a glass chamber is prepared by placing a plastic pipe (diameter decided by the thickness of the twig) between two [window] glass sheets (size depending on the overall size of the material) and putting clips on the sides & bottom as shown in the diagram. Clean O.H.P transparency sheets on the inside of the glass sheets have been found to be useful in preventing the plastinated specimen from sticking to the glass.

The twig is now carefully placed in the glass chamber & positioned properly using a blunt wire. A mixture of resin, catalyst & accelerator in the proportion of 100:5:0.1 is slowly poured into the chamber using a folded plastic funnel, till the twig is completely immersed. Repositioning the parts of the twig may be necessary.

Next day, confirming the resin has set, (touching the surface with a needle) slowly remove the clips one by one. Separate glass sheets from the O.H.P. sheets. Carefully pull apart the OHP sheets & tubing. Leave it dry for a few hours if necessary. Trim the edges using grinding stone. Attach the label in a corner. Stack them in dust proof boxes. Plastinated herbarium is ready.

3. Luminal Cast Plastination

This technique is useful to study the dimensions & architecture of different cavities of organs and to study the tubular – arterial, venous, ductal branches & their variations. The principle involves filling up of the lumen with material and dissolving the surrounding tissue. This is used for tracheo-bronchial cast of lungs, cerebral ventricles; bony labyrinth; vascular patterns of kidney, liver, lung, spleen, coronary vessels etc.

Fresh organ is preferred, because alterations during preservation give a wrong picture of the interior. The lumen is cleaned using warm tap water; heparinised solution; hydrogen peroxide or deaerated water containing dish water detergent. The mucus, blood, secretions, etc will be cleared. It pays to clean repeatedly with lots of patience till the fluid coming out is as clean as the ingoing one.

Approximate volume of the casting material necessary can be calculated by observing the amount of washing fluids used. After clearing the excessive amount of water in the lumen by blowing air and tilting the organ & draining by gravity, using appropriate sized plastic tubings & syringes, the plastination materials _ (Resins – are brittle preferably Rubber Silicone - available as ready packed gel – (used as sealant in engg. field)) is injected gently. Blocking or tying of entry port may be needed to prevent escape of material.

24 hrs later, some dissection of larger easily removable structures, and boiling for half to one hour dissolves most of the tissues, leaving the beautiful luminal cast materials. Some finishing touches may be necessary.

Colors can be added at any stage to highlight different areas. The cast is displayed in a suitable manner. The Rubber Silicone produces an excellent, soft, flexible cast, showing an unimaginable 3 – dimensional orientation of the cavity, including the abnormal extensions if any. Chloroform may be used to dilute the silicone for very fine lumina (Shrinkage is expected due to dilution)

Summary

In each of the above methods plastination produces an unique specimen at a very low cost, almost equivalent to the plastinated specimen of international quality. The protocol is so simple, that one can very easily start a Plastination lab in the dept. These are best suited for teaching purposes; discussions, training of diagnostic & therapeutic procedures; designing of newer surgical procedures; practice skills; research etc. There is a lot of scope for this technique in different biological fields & different branches of scientific field. Plastinates are models and teaching tools;are adjuncts to anatomical dissection;assist in teaching of endoscopy; and reduce the number of animals killed for research.

Day – 4
1st October, 2011

Session I
9.30 a.m. – 10.45 a.m.

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BIRD – WATCHING

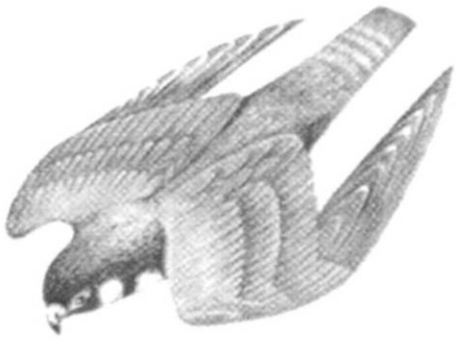
RP: Dr Sadanand

Birds are animals with feathers and wings. There are about 9,700 birds. The smallest is the bee humming bird, which grows only about 5cm long;he largest bird is the ostrich which may grow upto 8 feet tall. They live in all parts of the world from the polar region to the tropics. They belong to a large group of animals called verterbrate animals with a backbone. Birds have a hard bill or beak for getting food and for self-defense. People through out the world show interest in how the birds live and rear families. These people who specialize in the study of birds are termed as ornithologists.

Some of the interesting birds are given from Figs. 18 to 40

Fig. 18 : Bar headed goose *Anser indicus*

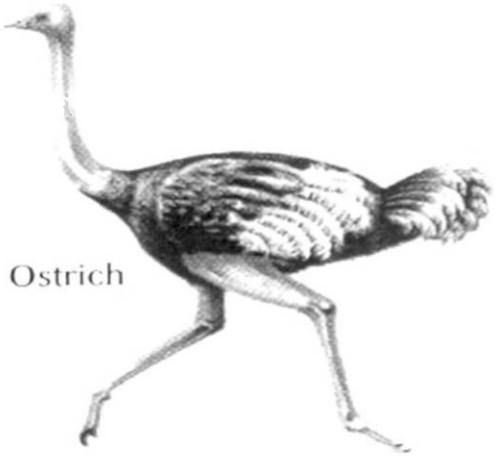
The fastest diver is the peregrine falcon. The bird's broad, powerful wings and streamlined body enable it to swoop down on its prey at a speed of more than 200 miles (320 kilometers) per hour.



Peregrine falcon

Fig. 19 : Peregrine falcon *Falco peregrinus*

The largest bird is the male African ostrich. It may grow as tall as 8 feet (2.4 meters) and weigh as much as 300 pounds (140 kilograms).



Ostrich

Fig. 20 : Male African Ostrich *Struthio camelus*. *O*striches are the fastest birds onland.

The smallest bird is the bee hummingbird. When fully grown, it measures about 2 inches (5 centimeters) and weighs about $\frac{1}{10}$ ounce (3 grams). The nest of a bee hummingbird is the size of half a walnut shell.

Bee hummingbird

Fig. 21 : The humming bird *Selasphhorus rufus*

The greatest traveler. Arctic terns migrate farther than any other bird. They travel about 11,000 miles (17,700 kilometers) each way between their breeding grounds in the Arctic and winter home in the Antarctic.

Arctic tern

Fig. 22 : The Arctic tern *Sterna paradisiaca*

The deepest diver is the emperor penguin. Emperor penguins have been recorded underwater at depths of almost 900 feet (275 meters). They use their wings to propel themselves through the water.

WORLD BOOK illustrations by Venner Artists, Ltd., James Teason, and John F. Eggert

Emperor penguin

Fig. 23 : Emperor penguin *Aptenodytes forsteri*

Scavenger birds help keep the Environment clean

Fig. 24 : Hawk and vulture

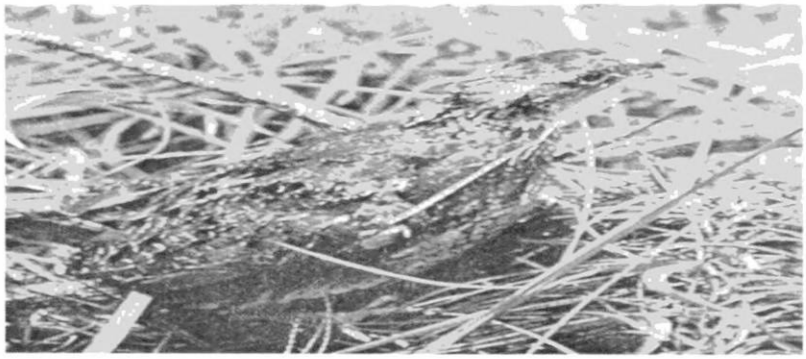


Fig. 25 : Sparrow

Poultry are birds reared for meat and eggs through out the world eg., chicken, turkey, ducks & geese

Douglas Dickins

A flock of ducks is kept in a flooded field on the Indonesian island of Bali. Although ducks are raised in many parts of the world, their meat is especially popular in eastern Asia.

Fig. 26 : Ducks

B. Josedupont, Jaca

Geese are fattened on grain in a French farmyard. France is one of the world's leading goose-producing countries.

Fig. 27 : Geese

Parrots, canaries, finches and parakeets sing well, speak and are beautiful

Fig. 28 : Parrots

House sparrow-*Passer domesticus* is a familiar sight in downtown areas of big cities and will nest in any small opening.

Fig. 29 : House sparrow-

Yellow-billed cuckoo-*Coccyzus americanus* nests in open woodlands found on the edges of forests,along river banks and in suburban areas.

Fig. 30 : Yellow-billed cuckoo

Purpled finch-*Carpodacus purpurea* is a pretty little song bird found in coniferous forests and woodlands.

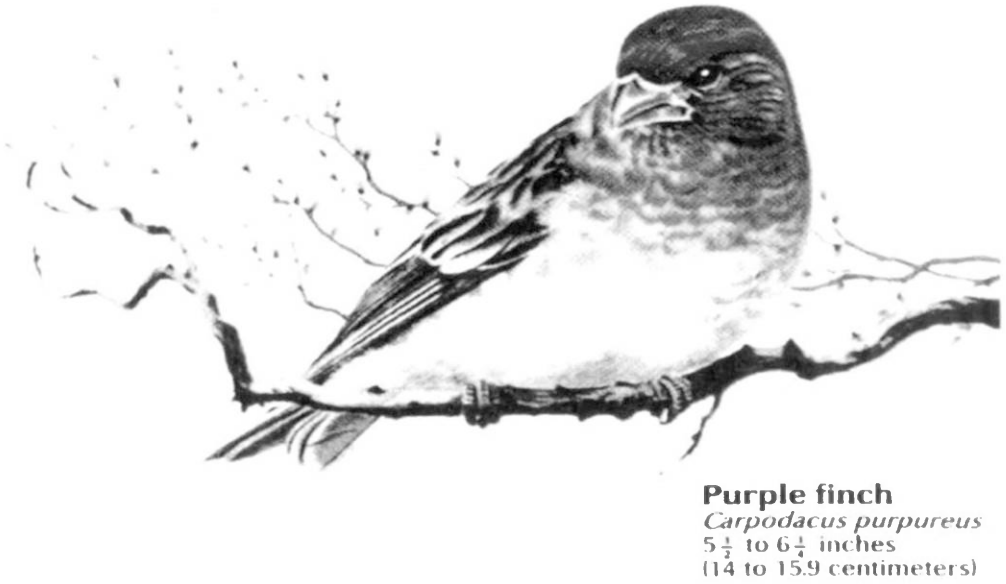


Fig. 31 : Purpled finch

Golden eagle-*Aquila chrysaetos* is a bird of the desert and eats meat.

Fig. 32 : Golden eagle

Great blue heron *Ardea herodias* is a bird of inland waters and marshes; they nest near the ocean and hunt fish in the shallow coastal waters.

Fig. 33 : Great blue heron

Belted kingfisher *Ceryle alcyon* perches alongside bodies of water and dives after fish that swim near the surface.

Fig. 34 : Belted kingfisher

Brown pelican *Pelecanus occidentalis* is a water-bird found along the sea-coasts.

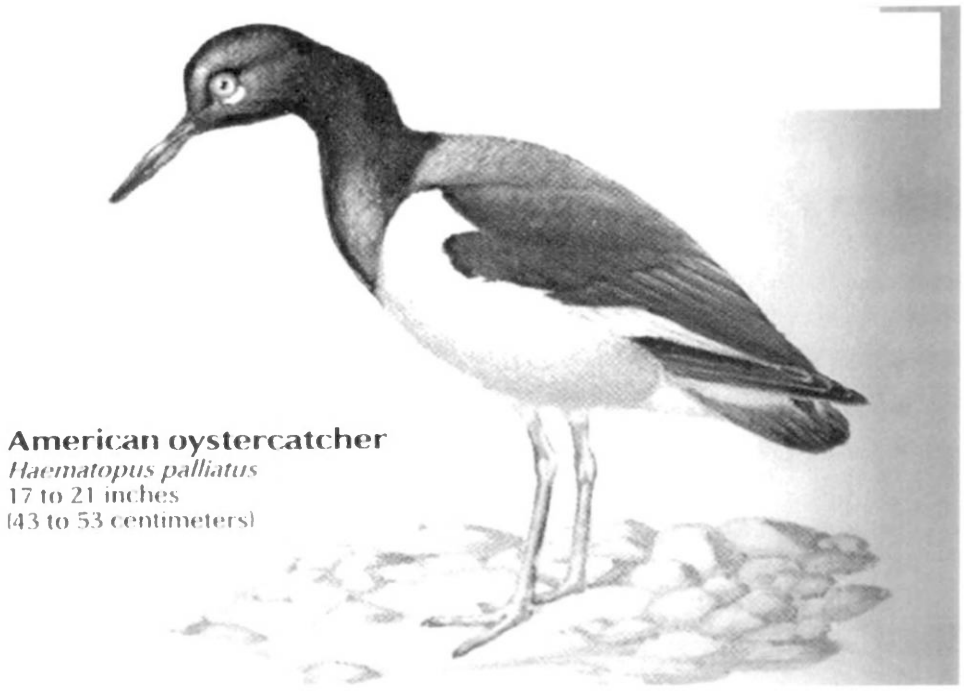


Fig. 35 : Brown pelican

White Stork Ciconia ciconia lives in grasslands and broad-leaved forests.

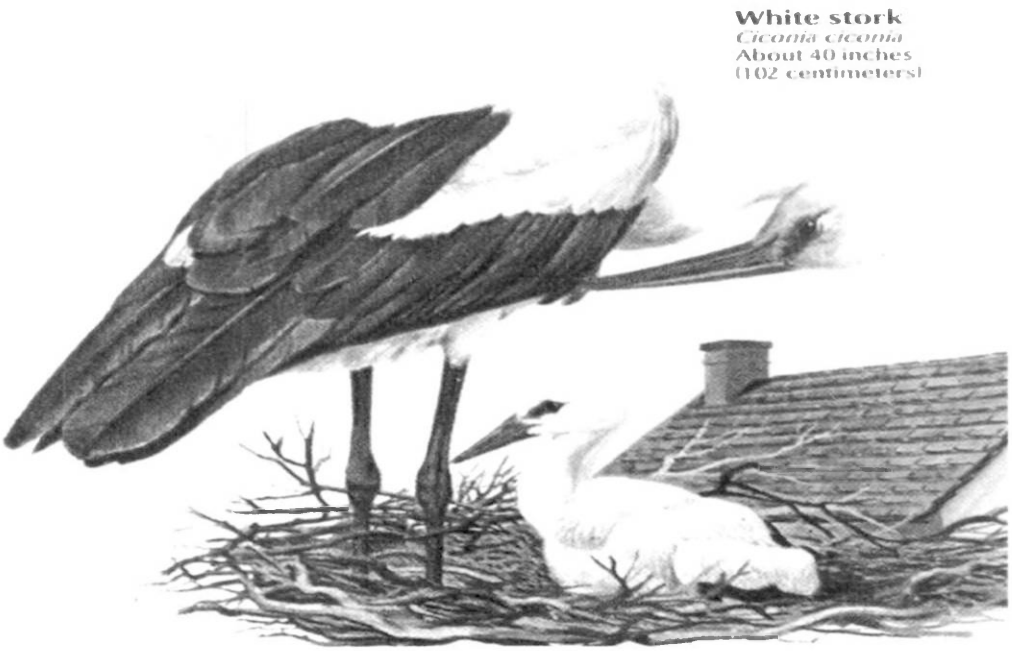


Fig. 36 : White Stork

Emerald Cuckoo *Chrysococcyx cupreus* is a colourful bird of the rain forests.

Fig. 37 : Emerald Cuckoo

Laughing Kookaburra *Dacelo novaeguineae* is a carnivorous bird of the kingfisher family and is well known for its laughing call

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Fig. 38 : Laughing Kookaburra

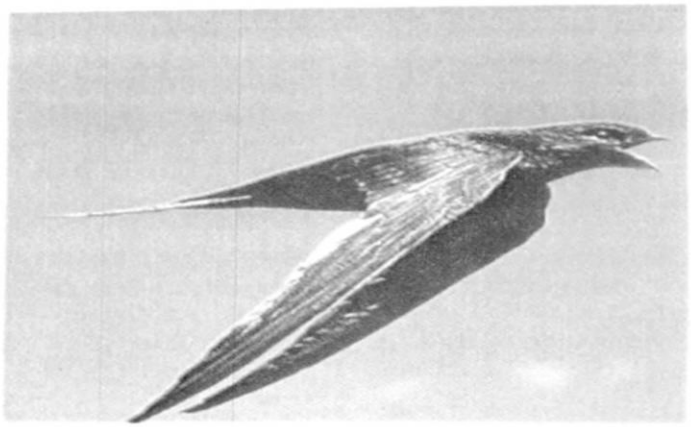
Hawk *Buteo jamaicensis*

Shelly Grossman, Woodfin Camp, Inc

A hawk captures a snake. Birds of prey use their sharp claws to seize animals and their razorlike bill to tear off flesh.

Fig. 39 : Hawk

Swift- *Apus apus*



Ducrot, Jacana

The swift feeds only on flying insects. The bird's extremely wide mouth enables it to catch insects in the air.

Fig. 40 : Swift

Bird watching is the observation of birds as a recreational activity. It can be done with the naked eyes through a visual enhancement device like binoculars and telescopes, or by listening for bird sounds. Birding often involves a significant auditory component, as many bird species are more readily detected and identified by ear than by eye. Most bird watchers pursue this activity for sound and recreational reasons.

The term bird-watching was first used in 1901; 'bird' was introduced as a verb in 1918. The terms birding and bird-watching are today used by some interchangeably although many participants prefer birding both because it does not exclude the auditory aspects of enjoying birds.

Birder and bird-watches have 2 different connotations. Birders are more versed in activities like identification (aural and visual), mostly distribution, migration timing and habitat usage. Birders travel specifically in search of birds, bird-watchers do not venture far from their own yards or local parts to view birds.

The early interest in observing birds for their aesthetic rather than utilitarian (mainly food) value is traced to the late 18^{th} century. In the late 19^{th} century there was a call for bird protection leading to the rising popularity of observations on living birds. The term bird-watching appeared for the first time as the title of a book "Bird Watching" by Edmund Selons in 1901.

The greatest variety of birds are seen during the spring or fall migrations. On these occasions large number of birds travel north or south to wintering or nesting locations. Early mornings are typically better as the birds are more active and vocal making them easier to spot.

Weather plays an important role in the occurrence of rare birds. In Britain, suitable wind conditions may lead to drift migration and an influx of birds from the east.

1. Due to their accessibility and ubiquity, birds are a useful tool for environmental education and awareness on environmental issues.
2. Birds easily transmit values on respect to nature and the fragility of ecosystems.
3. Bird-watching is a way of gaining status in some cultures.
4. Some term bird watching as an expression of male hunting instinct.

As the phenomenon of bird-watching has increased, the bird-watching etiquette also has developed for eg., promoting the welfare of the birds and the environment, avoiding stressing the birds through limited photography, pishing and playback devices, keeping back from nests and nesting colonies and respecting private property.

Day – 4
1st October, 2011

Session II
11.00 a.m. – 1.00 p.m.

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CHEMISTRY EXPERIMENTS AND ACTIVITIES

RP: Mr. A Nagraj

Experiments in chemistry are in general more interesting and phenomenal than other subjects as you can envisage immediate results in most of the cases. For eg., a diminutive rocket launch can be demonstrated in the chemistry lab using ordinary chemicals and articles of day to day use. An experiment is an ingenious activity planned meticulously and aimed at achieving a certain result Experiments in chemistry are all about how atoms, molecules and compounds react with each other in presence of other compounds to produce a third set of resultant compounds. The former are termed as reactants and the latter as products.

The following experiments were demonstrated and carried in test tubes in the laboratory.

1. Preparation of H_2 gas : For this concentrated hydrochloric acid was added to zinc pieces in a test tube resulting in the production of hydrogen gas. H_2 gas produces a pop sound when a burning splinter is brought into contact with it.

   $Zn + 2\ HCl \longrightarrow ZnCl_2 + H_2\uparrow$

   Zinc + Hydrochloric Acid $\longrightarrow$ Zinc Chloride + Hydrogen

2. Preparation of O_2 gas : Potassium chlorate when heated in a test tube produces potassium chloride and releases O_2 gas in which a lighted splinter continues burning.

   $2\ KClO_3 \longrightarrow 2KCl + 3O_2\uparrow$

3. Preparation of CO_2 gas : When acetic acid is added to Sodium bicarbonate it produces CO_2 which foams up on addition of shampoo. This CO_2 is collected in a beaker and when poured on a burning candle extinguishes the flame

   $2NaHCO_3 + 2CH_3\ COOH$ + Shampoo

   $\longrightarrow 2CH_3\ COONa + 2H_2O + CO_2\uparrow$ foam

4. Foaming with $H_2\ O_2$: Add hydrogen peroxide to potassium per managanate crystals – O_2 gas is produced. Addition of shampoo causes foaming of oxygen.

   $2H_2O_2$ + $KMnO_4$ crystals + Shampoo $\downarrow \longrightarrow 2\ H_2O + O_2\uparrow$

5. Rocketing : Potassium chlorate crystals are heated in a test tube in which incense sticks are placed (or splinters are placed).The splinters burn and sparks and smoke shoots out of the test tube in an effervescent manner. Oxygen released from potassium chlorate burns the splinter.

   $2\ KClO_3 \longrightarrow 2\ KCl + 3O_2 \uparrow$ burns

6. Dancing balls : Hydrochloric acid is added to a beaker containing sodium bicarbonate. Naphthalene balls when added to this mixture get surrounded by CO_2 gas molecules and float to the surface. On losing the CO_2 film they sink back into the mixture.
7. Charring of sugar : Concentrated sulphuric acid is added to sugar solution. This produces carbon as shown in the equation below leading to charring.

   $C_{12}\ H_{22}\ O_{11}$ + conc. $H_2SO_4 \longrightarrow C_{12} + 11\ H_2O$

   Other experiments that could be added to the above are:
8. Foaming volcano : A volcano is made of plaster or clay on which a 35 mm film container is placed. Add to the container 2 spoons of baking soda + 1 spoon of dish soap + 5 drops of red and yellow food coloring + one ounce of vinegar. A volcano foams and bursts.
9. Invisible ink : Baking soda is added to water (1:1 ratio) and the solution used for writing on paper. The paper is dried or heated against light or purple grape juice poured over it to see message clearly in different colors.

   Lime/orange/vinegar/ apple juice can be used as ink and the paper heated to read the message.
10. Evolution and production of CO_2 gas

    $CaCO_3 + 2\ Hcl \longrightarrow CaCl_2 + H_2O + CO_2 \uparrow$

    CO_2 is released when concentrated Hydrochloric acid is added to marble pieces. The gas puts out a candle lighted at the mouth of the tube.
11. Evolution and production of NO_2 gas.

    When Cone. HNO_3 acid is added to Copper, it results in the formation of NO_2 gas.
12. Dip blue litmus in acid and blue litmus turns red.

    Dip red litmus in base and red litmus turns blue.

Day – 4

1st October, 2011

Sessions III & IV

2.00 p.m. – 4.00 p.m.

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NUTRITION AND HEALTH vs MILK

RP: Ms. Mohana Laksmi N

Milk is an unavoidable part of human diet. Milk provides us with minerals, proteins, fats, carbohydrates and vitamins. So, it is also called a complete diet. 100gm of milk contains 66 kcals of energy, 87.8gms of water, 3.2gms of proteins, 3.9gms of fat, 4.8g of carbohydrates, 2.4gms of saturated fatty acids, 1.1g of monounsaturated fatty acids, 0.1gms of polyunsaturated fatty acids, 14 mgrms of cholesterol and 120 1U Calcium. Therefore, it is important to consume it on a daily basis. Raw milk contains important enzymes that aid in assimilating the nutrients present in milk. Raw milk serves as one of the best sources for calcium consumption.

Humans are an exception in the natural world for consuming milk past infancy, despite the fact that many humans show the characteristic of lactose intolerance (especially Africans and Asians). The sugar lactose is found only in milk and the enzyme needed to digest lactose, lactase, reaches its highest levels in the small intestines after birth and then begins a slow decline unless milk is consumed irregularly

Human milk contains on average 1.1% protein, 4.2% fat, 7.0% lactose (a sugar), and supplies 72 kcal of energy per 100 grams. Cow milk contains on an average 3.4% protein, 3.6% fat, and 4.6% lactose, 0.7% minerals, and supplies 66 keals of energy per 100 grms. Milk and milk products contain a good balance of proteins, fat and carbohydrate and are a very important source of calcium, riboflavin, phosphorous, Vitamins A, D and B12 and pantothenic acid. Milk products contain high quality protein (with amino acids lacking in poorer quality cereals and vegetable proteins).

In this session, the students were also told the deficiency diseases that can be prevented by drinking milk

For eg.,

Night blindness	is	prevented by Vitamin A
Scurvy	is	prevented by Vitamin C
Ricketts	is	prevented by Vitamin D
Dandruff	is	prevented by Curds
Beriberi	is	prevented by Vitamin B

Research has shown that boys should take at least 310ml and girls 350ml of milk. Ω is the symbol of National Dairy Association. Agmark is symbol given for pure Nandini Ghee.

Day – 5
2nd October, 2011

Sessions I & II
9.30 a.m. – 1.00 p.m.

***

MATHEMATICAL BRAIN TEASERS

RP: Dr B S Krishnamurthy

A highly stimulating work out in mathematics was carried out on the blackboard as well as using paper models. **The motto and the working principle of mathematics is to listen, think, read, write and practise.** The last step was considered extremely important for mathematics.

A list of the problems worked out in the sessions are attached herewith viz., **Dance with Maths (Ganitha Kunitha) puzzles.**

ಸೊನ್ನೆ ಸಾಮ್ರಾಜ್ಯ

ನಾವು ಭಾರತೀಯರು
ಗಣಿತದಲ್ಲತೀತರು
ಸೊನ್ನೆ ಶೂರರು ಸೊನ್ನೆ ವೀರರು
ಸೊನ್ನೆ ನಮ್ಮ ಶಕ್ತಿಯು ಸೊನ್ನೆ ನಮ್ಮ ಯುಕ್ತಿಯು
ಸೊನ್ನೆ ಇಂದ ಎಲ್ಲಾ ಸೊನ್ನೆಗೇನೇ ಎಲ್ಲಾ
ಸೊನ್ನೆ ಇಲ್ಲದೆ ಏನೂ ಇಲ್ಲ

ಕಾಲವೊಂದು ಇತ್ತು
ಆ ಕಾಲದಲ್ಲಿ ಸೊನ್ನೆ ಇಲ್ಲದಿತ್ತು
ರೋಮನ್ ಅಂಕೆಯೊಂದೆ ಜಗವನಾಳುತಿತ್ತು
ವಣಿಕರ ವ್ಯಾಪರದಲ್ಲಿ ಕಡಿಮೆ ಎಣಿಕೆ ಸುಲಭವಿತ್ತು
ದೊಡ್ಡ ಎಣಿಕೆ ತಲೆ ಬಿಸಿಯಾಗಿತ್ತು
ಕೂಡಿ ಕಳಿ ಓದು ಬರಹ ಬಹಳ ಕಷ್ಟವಿತ್ತು

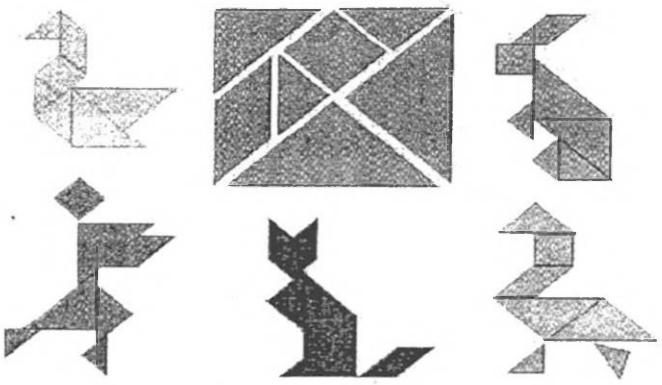
ಅಂದೆ ನಮ್ಮ ದೇಶದಲ್ಲಿ ಸೊನ್ನೆ ಕುಣಿಯುತಿತ್ತು
ಕೂಡಿ ಕಳಿ ಓದು ಬರಹ
ಎಲ್ಲ ಇಲ್ಲಿ ಬಹಳ ಸುಲಭ ಸುಲಭ
ಆಲೆಯ ಮೇಲೆ ತೇಲಿಬಂದ ಅರಬ ವಣಿಕರು
ಭರತ ಖಂಡ ದಡದಲ್ಲಿ ಸೊನ್ನೆ ಕಂಡರು
ಸೊನ್ನೆ ದೊಡ್ಡ ಶಕ್ತಿ ಸೊನ್ನೆಯೊಂದು ಯುಕ್ತಿ!
ಸೊನ್ನೆ ಬಳಕೆ ನೋಡಿ ಕಣ್ಣು ಕಣ್ಣು ಬಿಟ್ಟರು
ಹೆಗಲ ಮೇಲೆ ತಲೆಯ ಒಳಗೆ ಸೊನ್ನೆ ಒತ್ತು ಹೊಯ್ದರು
ಜಗದ ಮೂಲೆಲೆಲ್ಲ ಸೊನ್ನೆ ಸುದ್ದಿಯಾಯ್ತು
ಅಂದಿನಿಂದ ಇಲ್ಲಿವರೆಗೆ ಸೊನ್ನೆಯೇ ಸೊನ್ನೆಯೇ
ಜಗದ ಎಲ್ಲೆಯಲ್ಲಿ ಎಲ್ಲೆಲ್ಲೂ ಸೊನ್ನೆಯೇ ಸೊನ್ನೆಯೇ

ಸೊನ್ನೆಯಿಂದ ಕಲಿಯೋಣ
ಸೊನ್ನೆಯಿಂದ ಉಳಿಸೋಣ
ಸೊನ್ನೆಯನ್ನು ಬಳಸೋಣ
ಸೊನ್ನೆಯಿಂದ ಗಳಿಸೋಣ
ಸೊನ್ನೆಯನ್ನು ತೆಗೆಯೋಣ

ನಾವು ಭಾರತೀಯರು
ನಾವು ಸೊನ್ನೆ ಶೂರರು
ನಾವು ಸೊನ್ನೆ ವೀರರು
ಸೊನ್ನೆ ನಮ್ಮ ಯುಕ್ತಿಯು
ಸೊನ್ನೆ ನಮ್ಮ ಶಕ್ತಿಯು
ಸೊನ್ನೆಯೇ ಜಗದ ಗಣಿತ
ಸತ್ಯ ಉಲಿದ ಉಕ್ತಿಯು

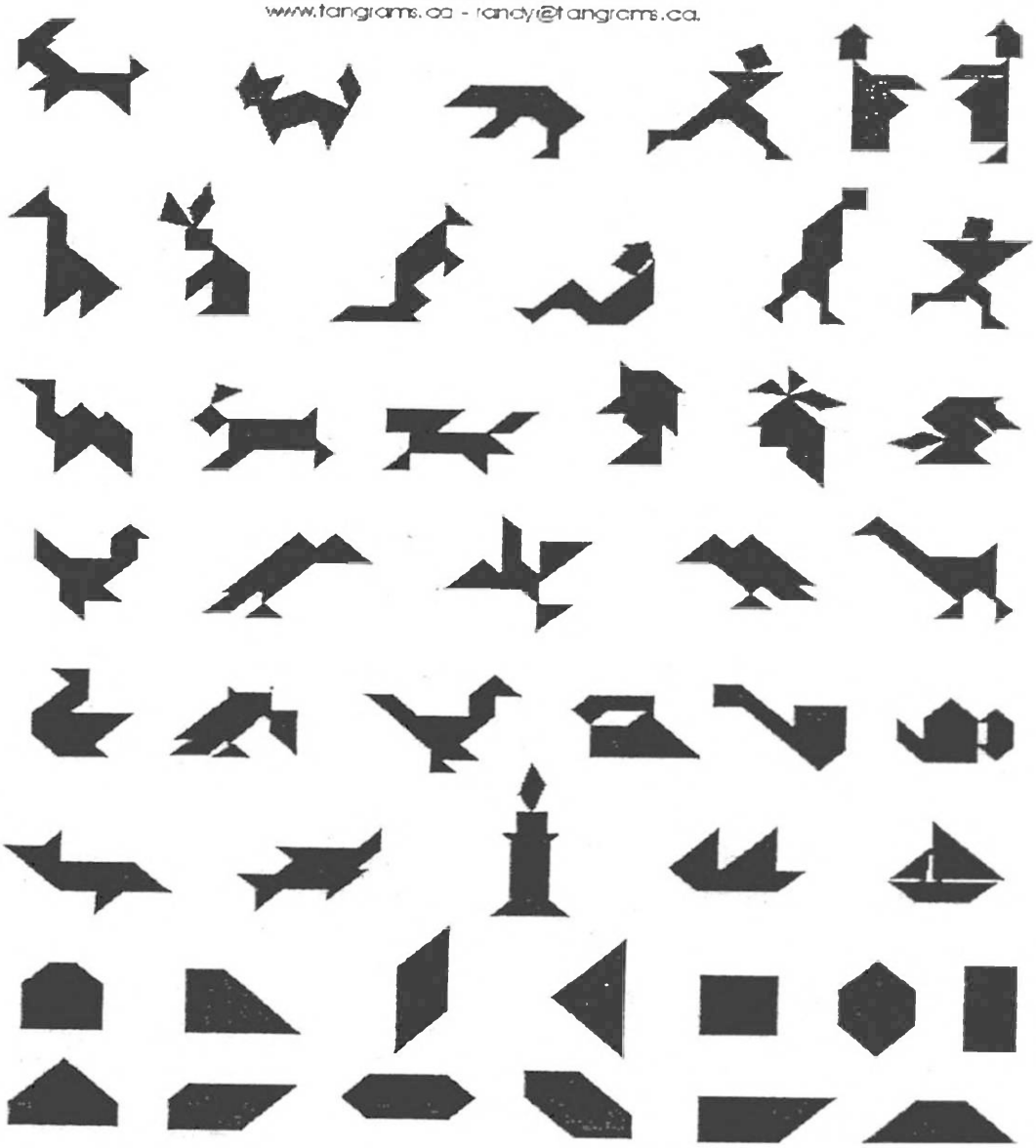
– ಬಿ.ಎಸ್. ಕೃಷ್ಣಮೂರ್ತಿ

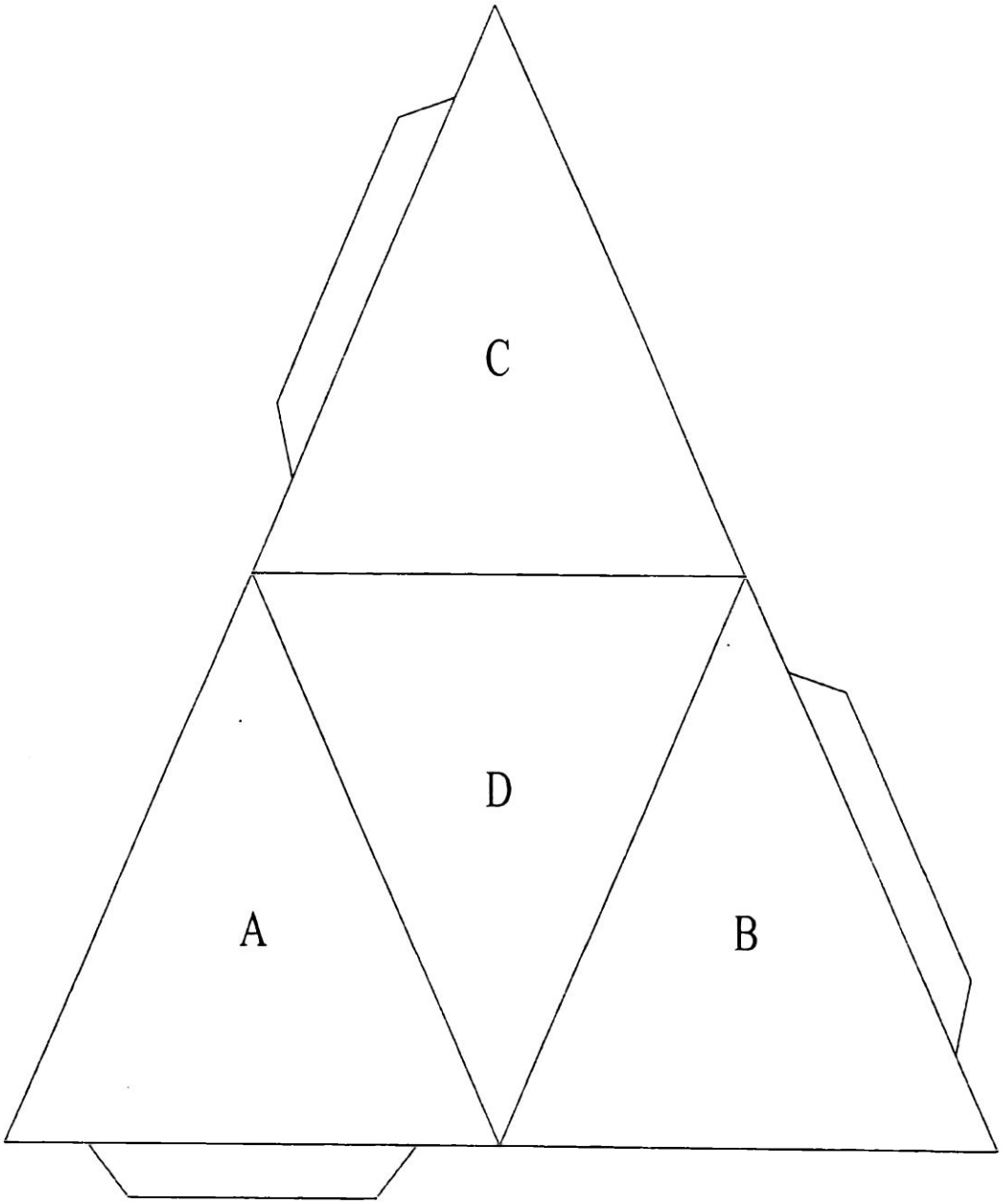
Here is a Chinese dissection puzzle consisting of a square cut into 5 triangles, a square and rhomboid to be converted into different figures. Tangram literally means "seven boards of skills". The seven shapes are called tans .The objective of the puzzle is to form a specific shape using all seven pieces which may not overlap.



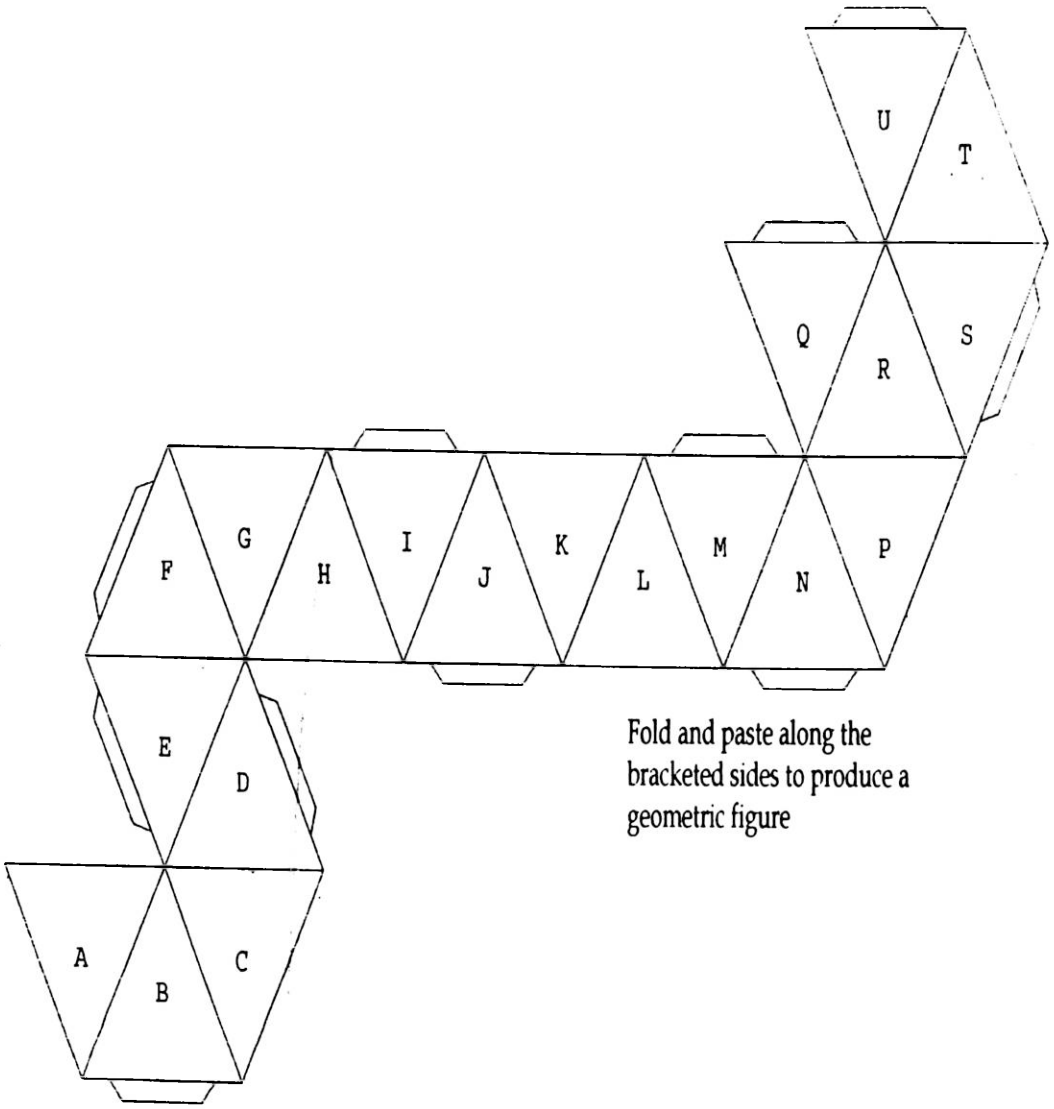
Tangrams

www.tangrams.ca - randy@tangrams.ca

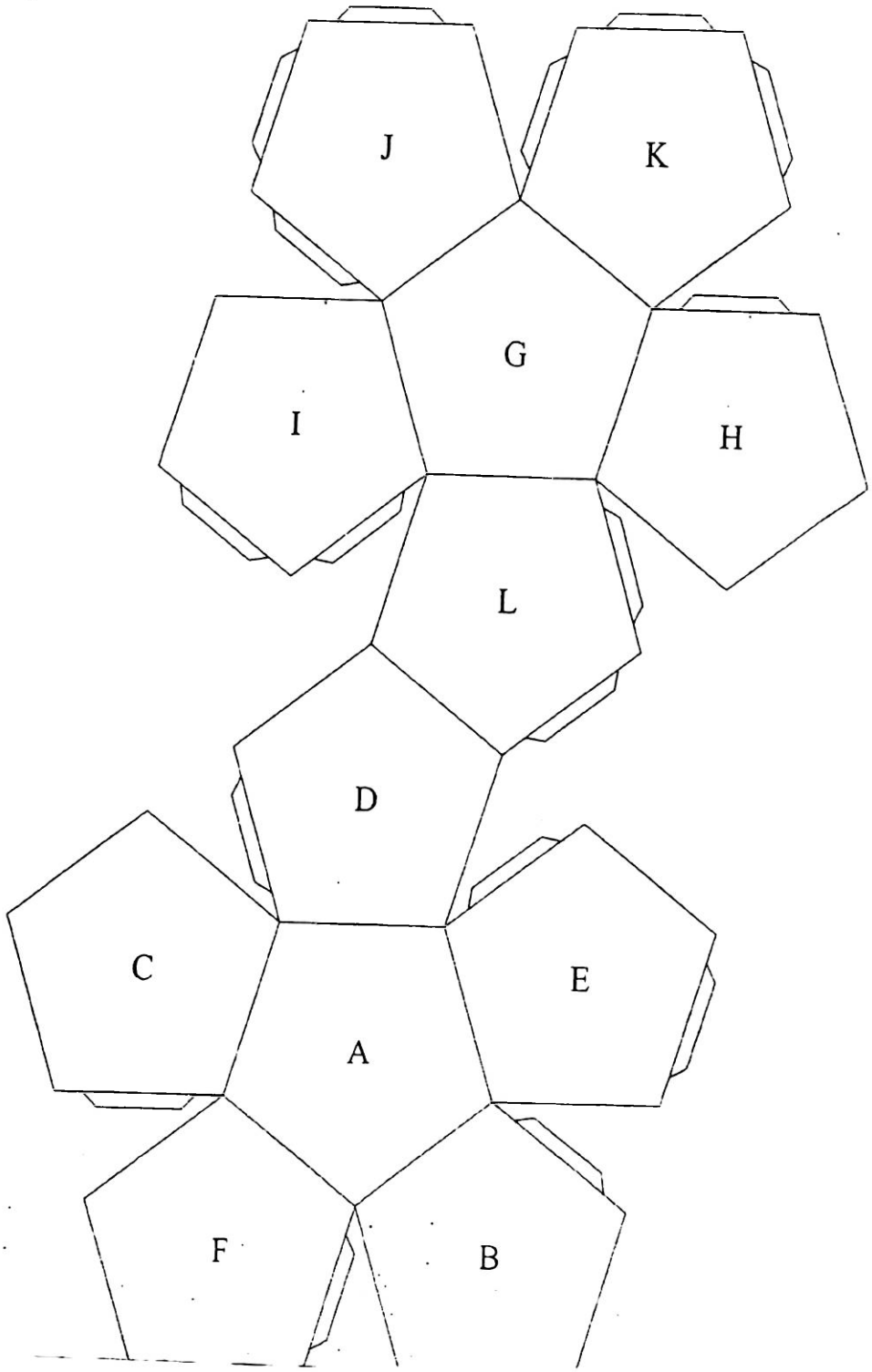




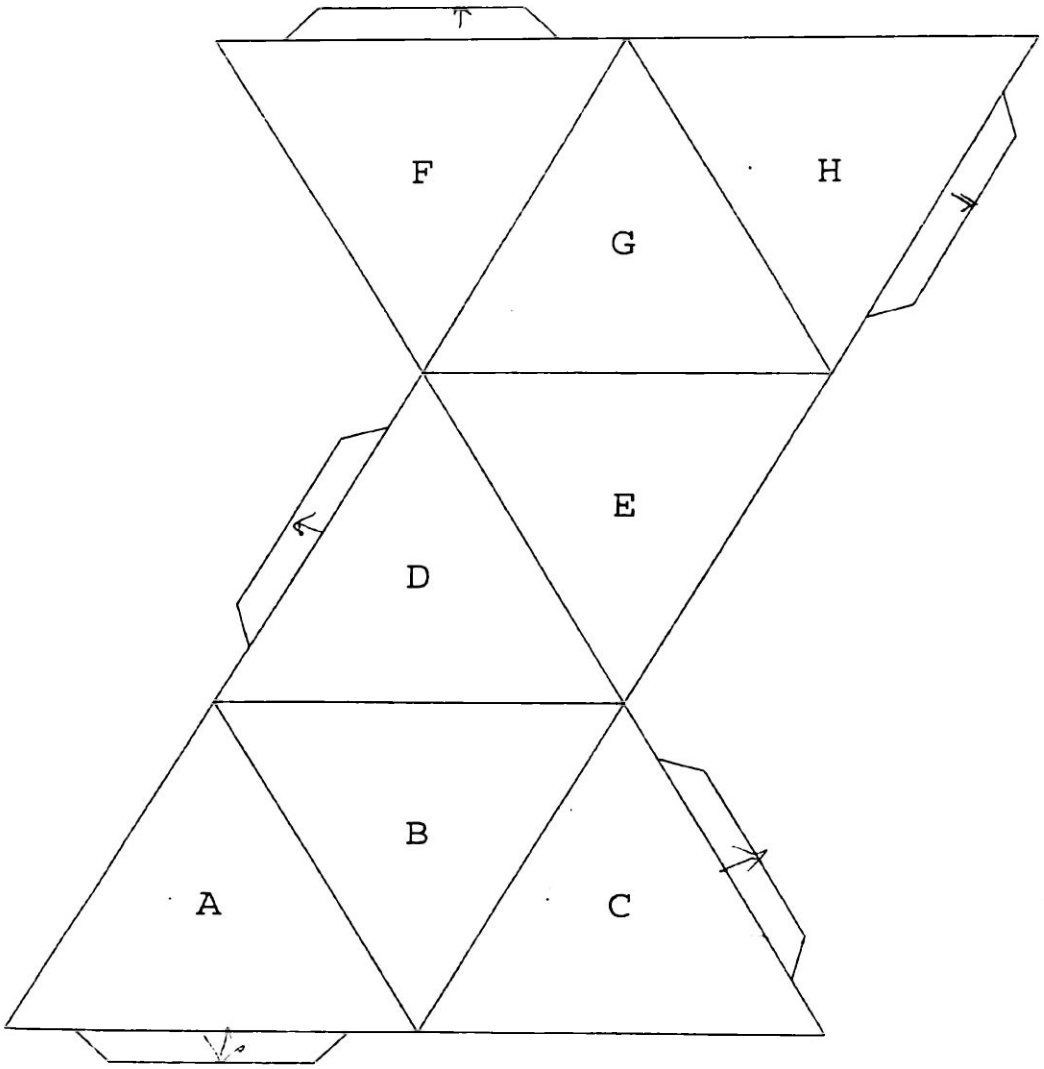
The students are supposed to cut and paste along the lines with gum using the folds given for making various geometric figures.



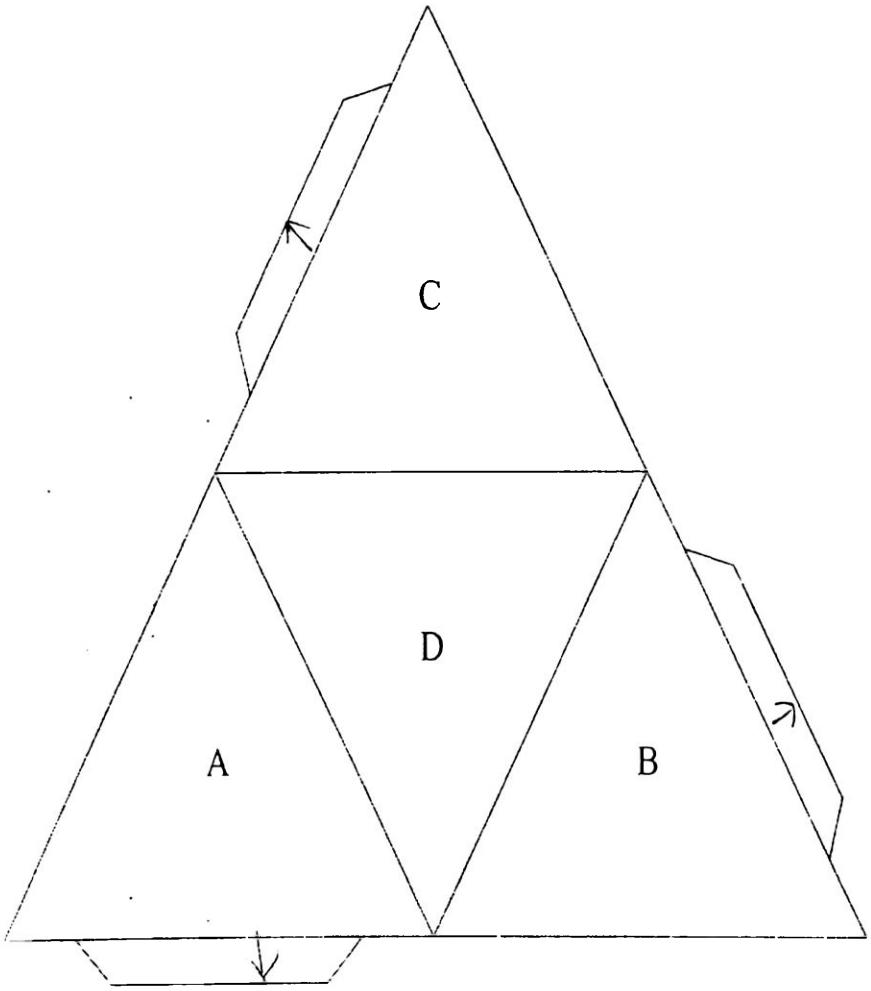
Fold and paste along the bracketed sides to produce a geometric figure



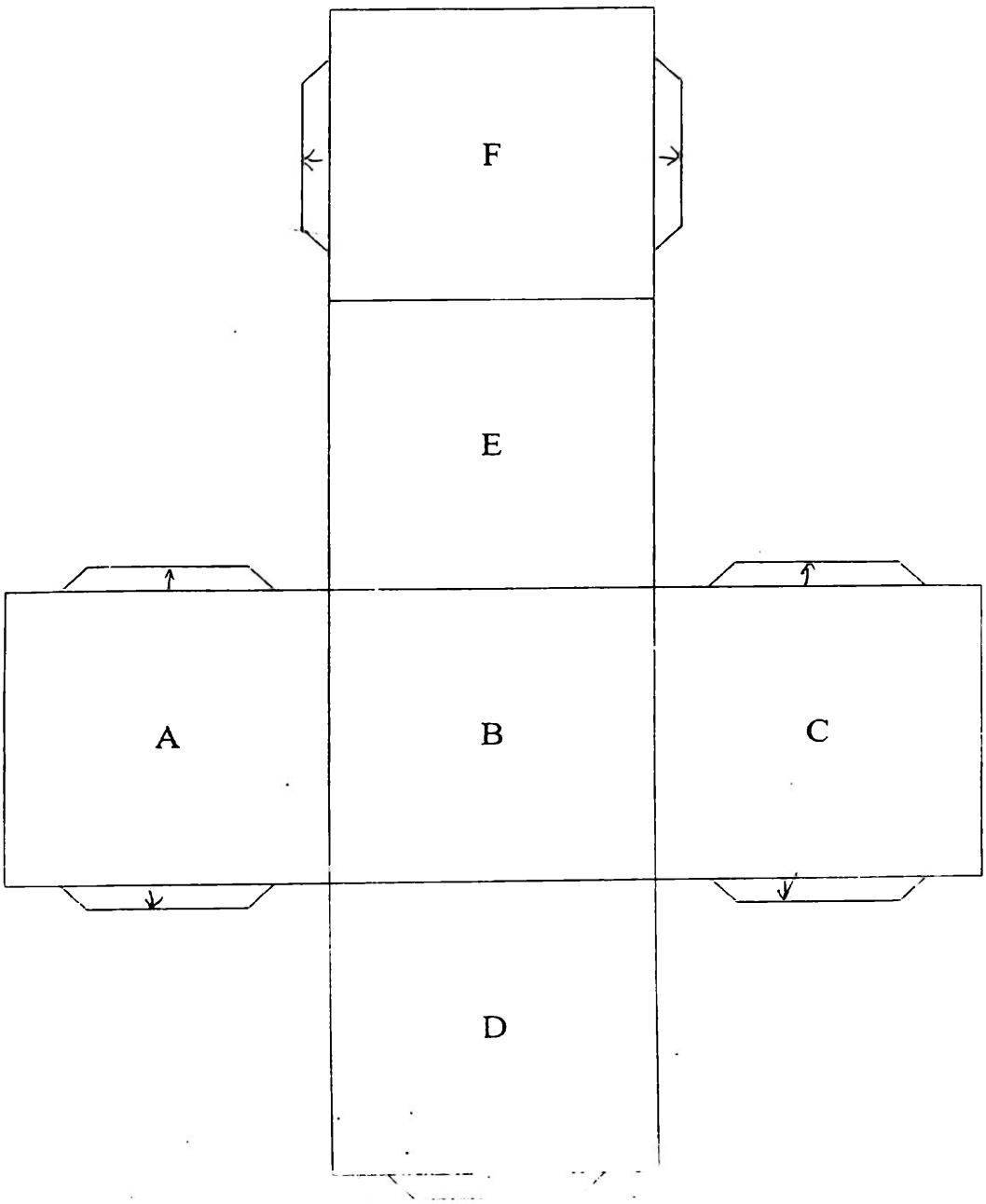
Fold or paste along the bracketed ends suitably to produce a geometric figure.



Fold or paste along the directions given to produce a geometric figure.



Fold or paste along the directions given to produce a geometric figure.



Fold and paste along the folded sides to produce geometric figures in the figure given below.

Concentration for Algebraic Properties

Cut out the cards below, place them face down and scramble them. Arrange them in a rectangular pattern on a table. The goal is to match the definition of each property with its name. One player selects a pair of cards to turn over. If the pair matches then the player keeps the cards and takes another turn. If the pair does not match then the player turns the cards back over in the same place, and the other player takes a turn. When all of the cards have been selected, the player with the most pairs wins.

The **commutative** property for **addition.**	The **commutative** property for **multiplication.**	The **associative** property for **addition.**	The **associative** property for **multiplication.**	The **distributive** property for **multiplication** over **addition.**
$5 + (3 + 4) = 5 + (4 + 3)$	$5 \cdot (3 \cdot 4) = 5 \cdot (4 \cdot 3)$	$5 + (3 + 4) = (5 + 3) + 4$	$5 \cdot (3 \cdot 4) = (5 \cdot 3) \cdot 4$	$5 \cdot (3 + 4) = 5 \cdot 3 + 5 \cdot 4$
The **identity** property for **addition.**	The **identity** property for **multiplication.**	The **inverse** property for **addition.**	The **inverse** property for **multiplication.**	The **multiplication** property of **zero.**
$255 + 0 = 255$	$255 \cdot 1 = 255$	$-255 + 255 = 0$	$255 \cdot \frac{1}{255} = 1$	$255 \cdot 0 = 0$

by Patrick Quigley

Concentration for Equivalent Fractions

Cut out the cards below, place them face down and scramble them. Arrange them in a rectangular pattern on a table. The goal is to match fractions which are equal in value. One player selects a pair of cards to turn over. If the pair matches then the player keeps the cards and takes another turn. If the pair does not match then the player turns the cards back over in the same place, and the other player takes a turn. When all of the cards have been selected, the player with the most pairs wins.

$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{3}$	$\frac{2}{3}$
$\frac{5}{20}$	$\frac{3}{6}$	$\frac{9}{12}$	$\frac{5}{15}$	$\frac{4}{6}$
$\frac{2}{5}$	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{3}{8}$	$\frac{5}{8}$
$\frac{6}{15}$	$\frac{24}{40}$	$\frac{20}{25}$	$\frac{9}{24}$	$\frac{10}{16}$

by Patrick Quigley

10^{102}	102	Trestrigintillion
10^{120}	120	Novemtrigintillion
10^{123}	123	Quadragintillion
10^{138}	138	Quinto-Quadragintillion
10^{153}	153	Quinquagintillion
10^{180}	180	Novemquinquagintillion
10^{183}	183	Sexagintillion
10^{213}	213	Septuagintillion
10^{240}	240	Novemseptuagintillion
10^{243}	243	Octogintillion
10^{261}	261	Sexoctogintillion
10^{273}	273	Nonagintillion
10^{300}	300	Novemnonagintillion
10^{303}	303	Centillion
10^{309}	309	Duocentillion
10^{312}	312	Trescentillion
10^{351}	351	Centumsedecillion
10^{366}	366	Primo-Vigesimo-Centillion
10^{402}	402	Trestrigintacentillion
10^{603}	603	Ducentillion
10^{624}	624	Septenducentillion
10^{903}	903	Trecentillion
10^{2421}	2421	Sexoctingentillion
10^{3003}	3003	Millillion
$10^{3000003}$	3000003	Milli-Millillion

This is a funny interesting part of maths. Know about the names for powers of 10 which are really amazing. Enjoy the Interesting Facts of numbers list. Enjoy it with Fun!

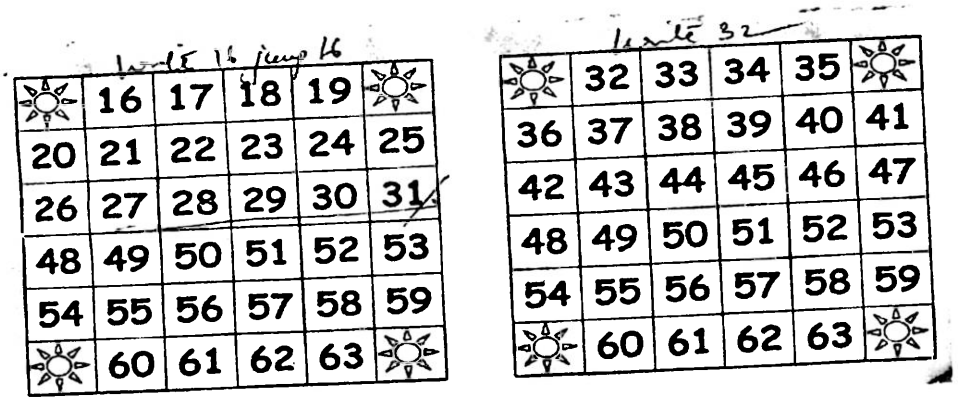
Values	Zero's	Names
10^0	0	One
10^1	1	Ten
10^2	2	Hundred
10^3	3	Thousand
10^4	4	Myriad
10^6	6	Million
10^9	9	Billion
10^{12}	12	Trillion
10^{15}	15	Quadrillion
10^{18}	18	Quintillion
10^{21}	21	Sextillion
10^{24}	24	Septillion
10^{27}	27	Octillion
10^{30}	30	Nonillion
10^{33}	33	Decillion
10^{36}	36	Undecillion
10^{39}	39	Duodecillion
10^{42}	42	Tredecillion
10^{45}	45	Quattuordecillion
10^{48}	48	Quindecillion
10^{51}	51	Sexdecillion
10^{54}	54	Septdecillion / Septendecillion
10^{57}	57	Octodecillion
10^{60}	60	Nondecillion / Novemdecillion
10^{63}	63	Vigintillion
10^{66}	66	Unvigintillion
10^{69}	69	Duovigintillion
10^{72}	72	Trevigintillion
10^{75}	75	Quattuorvigintillion
10^{78}	78	Quinvigintillion
10^{81}	81	Sexvigintillion
10^{84}	84	Septenvigintillion
10^{87}	87	Octovigintillion
10^{90}	90	Novemvigintillionn
10^{93}	93	Trigintillion
10^{96}	96	Untrigintillion
10^{99}	99	Duotrigintillion
10^{100}	100	Googol

Indian Numbers :

The Hindu-Arabic numeral system is a positional decimal numeral system. Many of the countries adopted the Indian numerals.

Values	0	1	2	3	4	5	6	7	8	9
bengali	০	১	২	৩	৪	৫	৬	৭	৮	৯
devanagari	०	१	२	३	४	५	६	७	८	९
gujarati	૦	૧	૨	૩	૪	૫	૬	૭	૮	૯
gurmukhi	੦	੧	੨	੩	੪	੫	੬	੭	੮	੯
kannada	೦	೧	೨	೩	೪	೫	೬	೭	೮	೯
malayalam	൦	൧	൨	൩	൪	൫	൬	൭	൮	൯
oriya	୦	୧	୨	୩	୪	୫	୬	୭	୮	୯
telugu	౦	౧	౨	౩	౪	౫	౬	౭	౮	౯
tamil	൦	க	உ	ந	சு	ரு	கூ	எ	அ	க

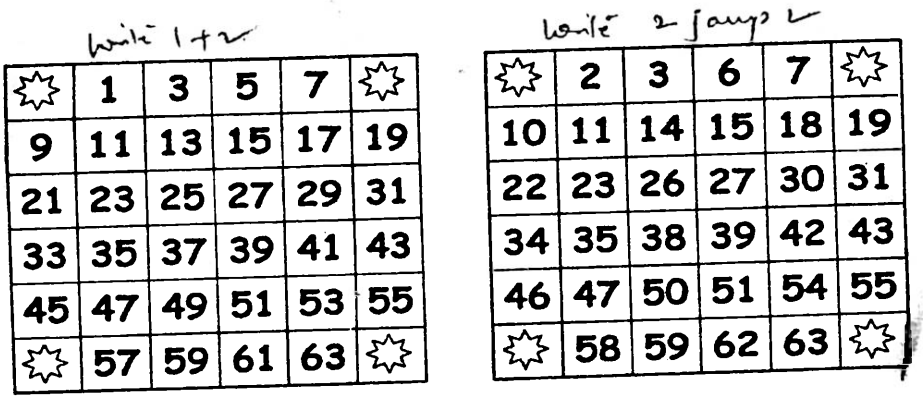
In the following exercises, the students are supposed to write and jump numbers. eg., write 16 jump 16 for the 1st figure below and jump 32 for the 2nd figure below.



	16	17	18	19	
20	21	22	23	24	25
26	27	28	29	30	31
48	49	50	51	52	53
54	55	56	57	58	59
	60	61	62	63	

	32	33	34	35	
36	37	38	39	40	41
42	43	44	45	46	47
48	49	50	51	52	53
54	55	56	57	58	59
	60	61	62	63	

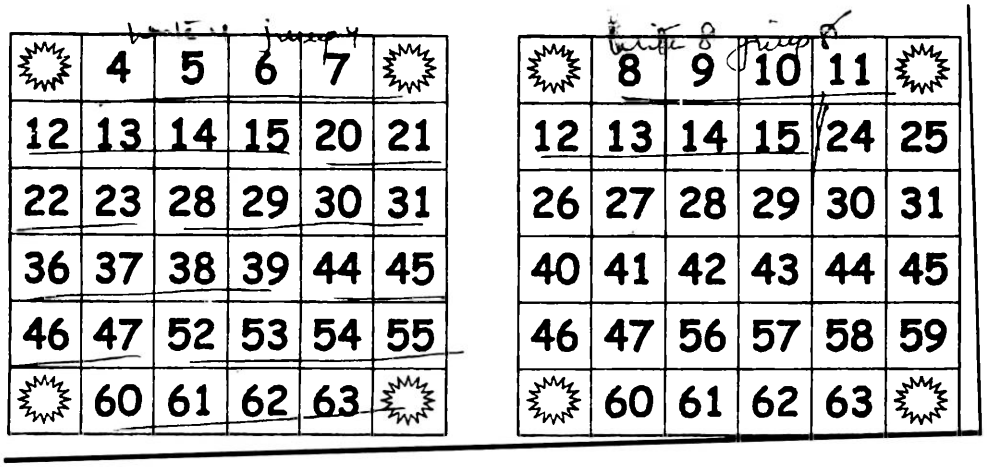
For eg., write 1+2 for the 1st figure below and write 2 jump 2 for the 2nd figure below.



	1	3	5	7	
9	11	13	15	17	19
21	23	25	27	29	31
33	35	37	39	41	43
45	47	49	51	53	55
	57	59	61	63	

	2	3	6	7	
10	11	14	15	18	19
22	23	26	27	30	31
34	35	38	39	42	43
46	47	50	51	54	55
	58	59	62	63	

For eg., write 4 jump 4 for the first figure below; write 8 jump 8 for the second figure below.



	4	5	6	7	
12	13	14	15	20	21
22	23	28	29	30	31
36	37	38	39	44	45
46	47	52	53	54	55
	60	61	62	63	

	8	9	10	11	
12	13	14	15	24	25
26	27	28	29	30	31
40	41	42	43	44	45
46	47	56	57	58	59
	60	61	62	63	

Day – 5
2nd October, 2011

Sessions III & IV
2.00 p.m. – 4.00 p.m.

***

YOU AND HEREDITY

RP: Dr L Srikantappa

Heredity can be defined as the transmissions of characters or traits (represented by genes) from parents to offspring. This transmission is through the formation of gametes, both male and female. Formation of gametes is a reductional process in the cell which involves reduction in the number of chromosomes from diploid numbers to a haploid number 'n'. The process is also known as meiosis with a prolonged prophase consisting of leptotene (thread like chromosomes), zygotene (pairing of homologous chromosomes), pachytene (thickening of chromosomes), diplotene (forming of chiasmata through crossing over) and diakinesis (or terminalisation of chiasmata). Crossing over brings about genetic recombinations and creates possibilities for change in genotypes and phenotypes in the succeeding generations thereby bringing about evolution of species.

Gregor Mendel in the 16^{th} Century performed several experiments with the Pea plant in the parish garden the results of which he later published as the laws of inheritance stated and explained as follows:

Mendel's Law I : This is also known as the Law of Dominance – according to which

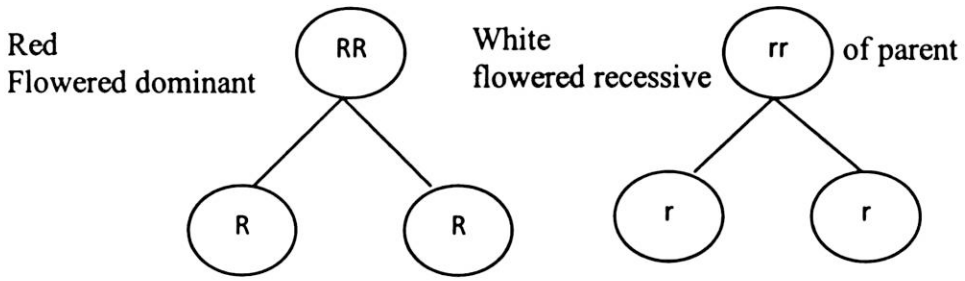
1. every character or trait has two manifestations – the phenotype and the genotype
2. every character is coded for by 2 genes – a dominant and a recessive gene; the dominant gene generally expresses itself but the recessive gene is latent

For eg: the red color of a flower is coded for by 2 genes

R – red – which is dominant
r – white – which is recessive red
RR – is homozygous dominant red
Rr – is heterozygous dominant red
rr – is homozygous recessive red

Mendel's Law II: Law of segregation states that during gamete formation, the factors or genes separate.

For eg. a heterozygous red flowered plant Rr will give 2 gametes R and r and a homozygous red will give R and R and a homozygous white would give you rr i.e. r and r.



	R	R
r	Rr	Rr
r	Rr	Rr

Mendel's III Law: Also known as Mendel's Law of Independent Assortment states that alleles for different traits are distributed in sex cells (and offspring) independently of one another.

Mendel noticed during all his work that the height of the plants and the shape of the seeds and the colour of the pods had no impact on one another. In other words, being tall did not automatically mean the plants had to have green pods, nor did green pods have to be filled only with wrinkled seeds, the different traits seem to be inherited independently.

The genotypes of one parent pea plant will be:

Rr Gg x Rr Gg

Where R = dominant allele for round seeds
r = Recessive allele for wrinkled seeds
G = dominant allele for green pods
g = recessive allele for yellow pods

The genotype letters need to be split up to come up with the possible gametes for each parent and a gamete (or sex cell) should get half as many total letters (alleles) as the parent and only one of each letter, so each gamete should have one 'are' and one 'gee' for a total of two letters. There are four possible letter combinations:- RG, Rg, rG and rg. We put it in a p-square, 4 columns above and 4 rows in front.

It may please be noted that each parent is hybrid for each trait of seed texture (round and wrinkled) and pod color (green or yellow) (i.e., there is one dominant and one recessive allele for each trait)

The results are as follows:

Table – 3 : Mendel's III Law

	RG	Rg	rG	rg
RG	RRGG Round	RRGg Round	RrGG Round	RrGg Round
Rg	RRGg Round	RRgg Round	RrGg Round	Rrgg Round
rG	RrGG Round	RrGg Round	rrGG Wrinkled	rrGg Wrinkled
rg	RrGg Round	Rrgg Round	rrGg Wrinkled	rrgg Wrinkled

9/16 - round & green

3/16 - round & yellow

3/16 - wrinkled & green

1/16 - wrinkled & yellow

From the above account it is seen that a green pod can have round or wrinkled seeds and the same is true of a yellow pod. The different traits do not influence the inheritance of each other. They are inherited independently.

The divisions responsible for multiplication of somatic cells is mitosis and is an equational division resulting in the formation of 2 daughter cells. The divisions that take place in germ cells are meiotic and result in the formation of 4 haploid cells or 4

cells with reduced number of chromosomes. Advantages of meiosis are segregation during gamete formation and genetic recombination. It is also responsible for the maintenance of ploidy levels in successive generations.

Genetic recombinations result in variations eg., the genome of man is diploid with 44 chromosomes and 2 sex chromosomes. Variations in the number of sex chromosomes causes the following diseases.

1. 47 (instead of 46) chromosomes causes Down's syndrome 2n = 45 + X X
2. 45 (instead of 46) causes Turner's Syndrome in Females 2n = 44 AA + X –
3. 47 (instead of 46) causes Klinefelter's Syndrome in males 2n = 44AA + XXY

Day – 6
3rd October, 2011

Sessions I & II
9.30 a.m. – 1.00 p.m.

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VISIT TO NANDINI DAIRY

RP: Dr. Geetha G Nair

Karnataka Milk federation (KMF) is the largest co-operative dairy federation in South India and Nandini Dairy is situated within the city limits of Mysore.

1. The milk products are Pasteurized Toned Milk (blue), Shubham milk (orange), Nandini double toned milk (yellow), Homogenized Cow's pure milk (green), Good life milk, Good life Slim milk, Sampurna Standardized milk, Smart Double Toned Milk, Good life UHT Long life milk.
2. Fermented products are Yoghurt, Curd, Butter milk, Premium curd large, Set curd and Sweet lassi;
3. Milk powder products are Dairy Whitener, Skimmed Milk Powder, Badam powders,
4. Ghee products are ghee in standby pouches, Butter Salted and unsalted, Ghee in Bag, Ghee in Pet jar, Ghee in Sachet.
5. Ice cream and Frozen Desserts products are Crazy Cone Ice cream Butter Scotch, Chocolate, Nandini Magic, Strawberry, Pista, Kulfi, Chocobar, Ice-cream Delightfully Tasty, Anjir Ice-cream Delightfully Tasty Chocolate; Ice Cream Delightfully Tasty Vanilla and Strawberry; Ice-cream Delightfully Tasty Kaju Draksh; Ice Cream Delightfully Tasty Mango, Ice cream Delightfully Tasty Kesar Pista, Ice cream Delightfully Tasty Pineapple; Dolly Stick Ice cream Strawberry, Sundae Ice cream, Butter Scotch Ball Ice cream, Vanilla Strawberry;
6. Milk sweets like Mysore Pak; Khova, Jamoons, Dry fruits, Burfi, Rossagolla, Assorted Sweets gift box, Nandini Bite, Premium Badam burfi, Besan ladoo, Premium Cashew Burfi, Premium milk elaichi and Kesar peda and Pure milk peda;
7. Other products like Nandini cream, Cheddar cheese, Nandini sugar free peda, Dharwad peda, Flavored milk pista and Mango strawberry, flavored milk Coolchoco milk shake, Flavored milk, Kunda paneer khova, Gulab Jamoon mix, flavored milk etc., chocolates like creamy bite, éclairs, good life chitchat and éclairs.

KMF Milk Products come under Nandini Brand Name

The Processing of Milk

Most of the times centralized dairy facilities process milk and milk products eg., creamy butter and cheese.

I. **Pasteurization:** This is used to kill harmful micro-organisms by heating the milk for a short time and then cooling it for storage and transportation Pasteurized milk is perishable and must be stored cold by both suppliers and consumers. Stores should remove any unsold milk from their shelves after expiration dates. The process destroys the vitamin content of the raw milk.

II. **Ultrapasteurization:** This is ultra high temperature treatment where milk is heated to a higher level for a shorter amount of time – extending its shelf life and allowing the milk to be stored unrefrigerated because of the longer lasting sterilization effect

III. **Microfiltration** : It is a process that partially replaces pasteurization and produces milk with fewer microorganisms and longer shelf life without a change in the taste of the milk Hence cream is separated from the whey and is pasteurized in the usual way, but the whey is forced through ceramic micro-filter that filter 99.9% of micro-organisms in the milk (as compared to 95% killing of micro-organisms in conventional pasteurization). The whey then is recombined with the pasteurized cream to reconstitute the original milk composition.

IV. <u>Creaming and homogenization</u>

<u>Creaming</u> : Upon standing for 12 – 24 hours, fresh milk has a tendency to separate into a high fat cream layer on top of a larger low fat milk layer. (The cream is sold as a separate product with its own uses). Today the separation of the cream from the milk usually is accomplished rapidly in centrifugal cream separators. The fat globules rise to the top of a container of milk because fat is less dense than water. The fat globules in milk form clusters containing about a million globules, held together by a number of whey proteins.

Homogenization: This is a treatment that prevents a cream layer from separating out of the milk. The milk is pumped at high pressures through very narrow tubes, breaking up the fat globules through turbulence and cavitation. Casein micelles are attracted to the newly exposed fat surfaces and therefore the new membrane structure. Casein weighs down the globules and interferes with clustering. The exposed fat globules are vulnerable to certain enzymes present in milk, which could break down the fats and produce rancidity. However to prevent this, the enzymes are inactivated by pasteurizing the milk immediately before or during homogenization.

Homogenized milk is blander but creamier; is whiter and resistant to developing flavors and is more digestible.

Ultra-homogenization : This is homogenization under high pressure and has a longer shelf-life. In order to prevent spoilage, milk can be kept refrigerated and stored between one and four degrees Celsius in bulk tanks. Most of the milk is pasteurized by heating briefly and then refrigerated to allow transport from factory farm to local markets.

Day – 6

3rd October, 2011

Sessions III & IV

2.00 p.m. – 4.00 p.m.

***

POLYMERS AND BIOMEDICALS

RP: Dr Rajesh, JSS Medical College

Natural origin biopolymers are attractive for use in biomedical application partly due to their biocompatibility and degradation characteristics.

Biocompatible polymers are the platform for drug delivery and molecular imaging. The idea of using synthetic and natural biocompatible polymers as a platform to improve pharmacokinetics and delivery efficacy of small molecular therapeutic drugs is not new. Biomedical polymers have been widely used as carriers for drugs for example polymer-drug conjugates, polymeric micelles, polymer protein conjugates and polyplexes have been designed for the delivery of chemotherapeutics, proteins and gene therapeutics. The conjugation of drugs to polymers can increase solubility and stability of the drugs while reducing their systemic toxicity. The coupling of drugs to water-soluble biomedical polymers has the principal effect of limiting cellular uptake by pinocytosis and therefore altering drug pharmacokinetics at the whole organism and cellular level. The polymer drug conjugates can passively accumulate within solid tumor tissues due to the hyper permeability of tumour blood vessels and poor drainage of tumour tissues. Also polymers can be designed to be multifunctional and can be modified by using targeting – moieties to enhance drug targeting. The combination of drug delivery and molecular imaging on the same polymer platform will result in more effective image guided therapies. The earlier a disease can be diagnosed and a therapeutic drug can be delivered the better the chance that the disease can be cured quickly. This is the rationale for the combination of polymer platform in drug delivery and imaging.

Chinese researchers have developed the first soluble polyurethane (PU) with controllable properties that could make it suitable for biomedical applications. For biomedical use, a polymer needs to be non toxic and compatible with blood and tissue. Although PUS are used for pacemaker wire insulation and artificial hearts they degrade overtime. If and when the surface of the material becomes damaged, potentially dangerous blood clots can form – a process known as platelet adhesion.

Many opportunities exist for application of polymers in biomedicals. Degradation of the polymer is important in bio-medicine for many reasons. Degradation of the polymeric implant means surgical intervention may not be required in order to remove the implants at the end of its functional life, eliminating the need for second surgery. In tissue engineering, biodegradable polymers can be designed to approximate tissues providing a polymer scaffold that can withstand stresses, provide a suitable surface for cell attachment and growth and degrade at a rate that allows the load to be transferred to the new tissue.

Hydrogels ie., materials consisting of a permanent, 3 dimensional network of hydrophilic polymers and water filling the space between the polymer chains have a number of biomedical applications such as wound care products, dental and ophthalmic materials, drug delivery systems, elements of implants, constituents of hybrid type organs as well as stimuli-sensitive systems..

There are 3 general situations in which biomaterials are used: to sustain life or limb viability; to restore or improve function; to restore or improve contour and there are 3 main classes of materials for biomedical use – viz., biological tissues, metals and ceramics and polymers.

Most cardiovascular and neurosurgical implants are in the first category eg., cardiac valves, vascular grafts, pacemakers, and hydrocephalus shunts. These implants have allowed major advances in treatment.

The second category includes biomaterials intended to restore function such as joint replacement, fracture fixation devices, and dental implants. The success rates vary significantly in this category, ranging from excellent results in total hip replacement to lesser success rates in other joints.

Facial reconstruction and breast augmentation are procedures representative of the 3rd category (restore or improve contour). Even though these are not employed in life threatening situations, they play an important role in psychological and social well being.

Day – 7
4th October, 2011

Session I
9.30 a.m. – 10.45 a.m.

***

ANALYSIS OF WATER AND ECOLOGICAL STUDIES

RP: Dr A Sukumar

It is needless to emphasize the importance of water in our life. We need water for different purposes. We need water for drinking, for industries, for swimming, for fishing etc. The water used for different purposes has its own requirements and has to be analysed on a regular basis to conform to suitability. The types of analysis could vary from simple field testing or a single analysis to laboratory based multi-component instrumental analysis.

A sampling strategy is used to optimize value of analytical information collected. The container materials to be used for sample collection may be made of glass or polythene. Amount of suspended solids, oxygen demand (measuring oxidisable material), total organic carbon, electrical conductivity and water hardness can be measured.

I Determination of suspended solids

Suspended solids in natural water bodies cut down high transmission through the water and lower the rate of photosynthesis system in plants. This determination is extremely valuable in the analysis of polluted water.

Sample size – 50 ml (layer samples are difficult to filter). Filter the sample

Weigh once again. Wt of solids removed is 20 mg. Weighing done using gooch crucibles which are carefully prepared and brought to constant weight before use

II Measurement of Dissolved oxygen

The dissolved oxygen can be determined by the Winkler (iodometric) method or by the use of dissolved oxygen electrodes.The concentration of oxygen in saturated water is dependent on temperature; pressure and salinity of the water and it is customary to think of dissolved oxygen levels of sample about as being the maximum available under critical conditions. Contact with air cannot be avoided during the time the sample bottles are being filled. The samples are fixed immediately after collection. The samples are treated with the conventional reagents used in dissolved oxygen test and then the titration samples are brought to the laboratory.

Biochemical oxygen demand (BOD) is measured as follows:

1. Fill two 300 ml bottles with water sample.
2. (a) The dissolved oxygen of the first bottle is measured as follows:
   b) First sample bottle + $MnSO_4$
   alkaline iodideazide mixture.
   iodide is necessary for analysis
   Azide is necessary to prevent interference from nitrite ions
   c) The sample is transferred to lab and acidified
   d) The released Iodine is then titrated with sodium using starch as indicator.
   e) 4 moles of thiosulphate in the final titration is equivalent to 1 mole of oxygen in the sample.
3. The second bottle is incubated under 20^0C (adjusted to pH between 6.5 and 8.5 in the dark under standard conditions) for a period of 5 days which are designed to be ideal to promote microbial activity and the dissolved oxygen is once more measured.
4. The difference between the two DO values is the amount of oxygen that is consumed by microorganisms during the 5 days and is reported as BODs (5-day BOD) value of the sample.

III. pH and Alkalinity and Acidity:

pH meter is calibrated using standard buffers of pH 4.000, 7.00 and 10.00.

Soft water has pH of 5.3 – 7.4

Hard water has pH of 7.6 – 8.8

Sea water has pH of 8.2 – 9.2

Water affected by

Acidic pollutants has ph of 2.2 – 4.8

pH of H_2O in equilibrium with atmosphere } is 5.6

Unpolluted rain water with dissolved CO_2 has pH of 5.6

IV. *Paramecia* culture

Boil half pieces of hay for 10 minutes in a glass container. Add few grains of rice. Cool for a day. Inoculate medium with few drops of pond water containing *Paramoecia.* Plug the mouth or container with cotton and leave it for ten days. Observe under microscope.

OR

Fill a fish tank with water. Put *Paramecium* in fish tank. Find *Paramecium* in carrot peels. It takes several weeks for the culture to grow. Paramecium can be seen only with the microscope.

** *Paramecium* and *Amoeba* were shown in the class as microscopic specimen slides.

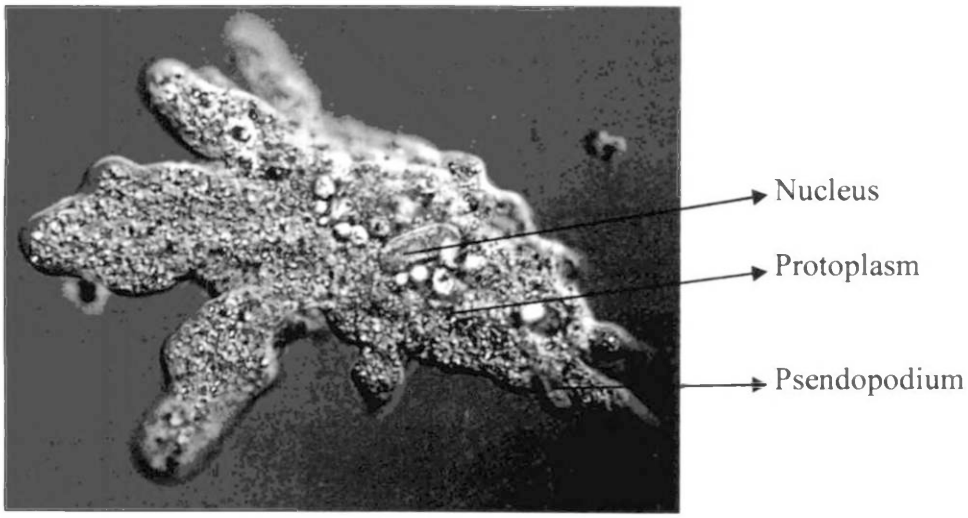

Fig. 41 : Amoeba

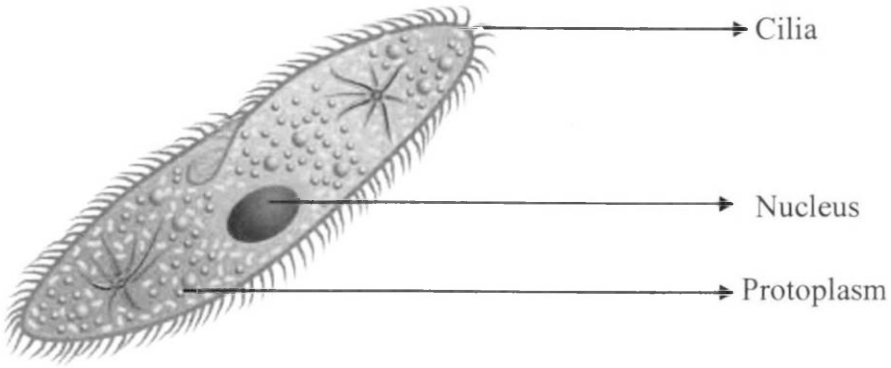

Fig. 42 : Paramecium

V. Measurement of Lung Capacity

Lung capacity of students were determined by breathing out air into a bottle containing water as follows through a glass tube. The bottle has 2 glass tubes bent at right angles and inserted through a cork. Water gets expelled through the second tube.

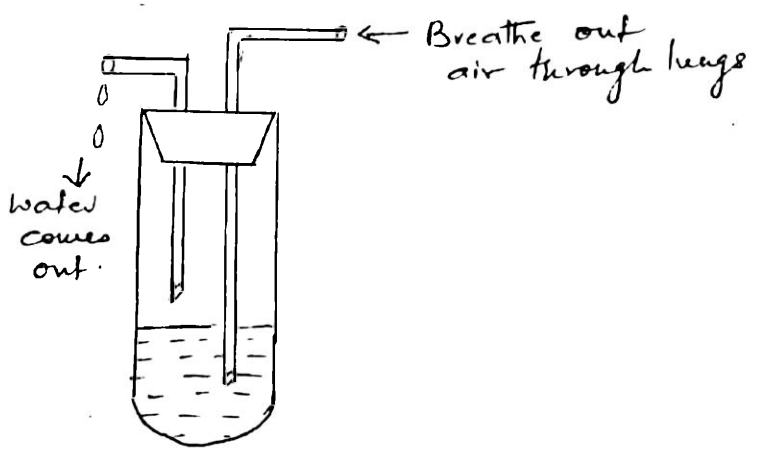

Fig. 43 : Experimental set-up for measurement of lung capacity

The volume of water expelled determines lung capacity.

VI. Measurement of respiration rate:

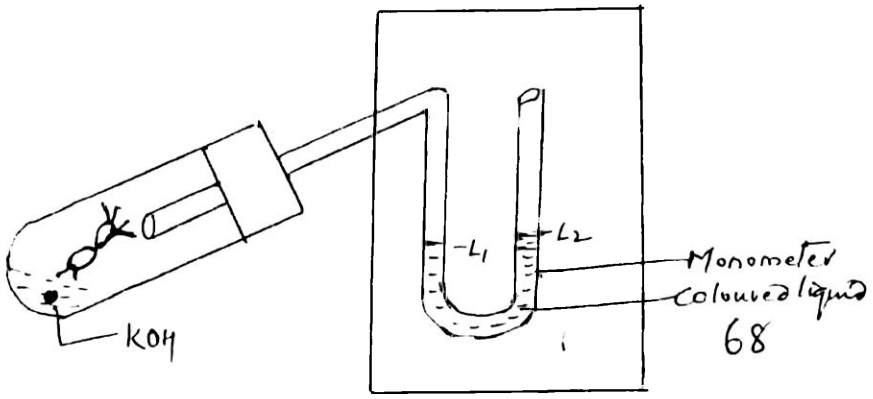

Fig. 44 : Experimental set-up for measurement of respiration rate

**** Respiration rate in insects: This was determined using a monometer.

An insect is placed in a test tube with a little KOH. The test tube is corked and a monometer (U shaped) with colored liquid is inserted through the cork. The levels of colored liquid are L1 and L2. When insect respires CO_2 is released and absorbed by KOH raising the level in one arm of monometer which can be measured.

Day – 7
4th October, 2011

Session II
11.00 a.m. – 1.00 p.m.
***

COMPUTER GAMES AND NET

RP: Mr. Mahesh, NIIT Lab, RIE, Mysore

Games

The following games were downloaded from www.zapak.com and played using flash player.

1. Adriansbattle using macromedia Flash Player
2. Air attack 3 using macromedia Flash Player
3. Bushshoot out using Bushshoot out Miniclip.com
4. Fish-shoot using macromedia Flash Player 6.0
5. Planet War II using macromedia Flash Player 6.0
6. Stress Relief Paint Ball using macromedia Flash Player
7. Office – Getaway using macromedia Flash Player
8. Shrunken Assault using macromedia Flash Player
9. Western (1) using macromedia Flash Player

The games could be downloaded from www.myplaycity.com. as well.

Day – 7
4th October, 2011

Session III
2.00 p.m. – 3.00 p.m.
***

DEBATE AND VISIT TO SCIENCE PARK

RP: Dr. Tangpu and Dr. G R Prakash

I. Topic for Debate: Is Science a blessing or a Curse?

All that which is about the study of matter is Science and is based on logic and reasoning. The study and practice of science has led to the progress of civilization – from the Paleolithic man and his stone tools to the discovery of fire; the transit from a nomadic life to settlements and establishment of civilizations on the banks of rivers all over the world; domestication of plants thereby, ushering agriculture; domestication of animals, live stock and poultry; from Edisions first electric lamp to later technological advances; from printing to discovery of rubber revolutionizing the automobile industry; from the first telephonic device to morse code to the communication revolution; from Mendel's Laws to the discovery of gene structure (Watson and Crick model); from Bohr's atomic model to the discovery of sub-atomic particles; from knowledge of light radiations to infra-red and ultra-violet radiations in Science. Science has progressed from nature vs. nature to man vs. nature. With advances in Sciences man has conquered nature but this has been detrimental to Man himself.

It is a blessing and without bioethics it is a curse.

Table – 4 : Science as a blessing vs curse

It is a Blessing because	Curse because it has
- It has helped us overcome diseases. - It has increased life expectancy and reduced mortality - It has helped us overcome the vagaries of nature like erratic rain fall, storms, cyclones, tsunami etc. - It has increased agricultural produce and led to green revolution - It has corrected fallacies in conception of the early moon and other planets of solar system - We are able to go to Moon, Mars, Jupiter etc.	- led to the formation of concrete jungles - Decreased forest cover through felling, mining etc. - Increased release of maximum gases into atmosphere through oxides of nitrogen from automobiles and factories - Destroyed the protective umbrella of earth – O_3 layer - Increased CO_2 levels and therefore green house effect. - Melted polar caps and led to flooding and sinking of cities in sea water.

II. Visit to Science Park

For the amusement and education of school students a Science Park has been constructed in the premises of RIE, Mysore where they learn several concepts of Physics and working principles of machines through a play-way method. These gadgets and machines have been cast in wrought iron and painted in bright attractive colours and fixed in the garden in order to facilitate their learning while playing.

The constructs elucidate the principles of simple pendulum, the lever, the inclined planes, the swing, circular motion, force, pulley, wheels etc. and they are as enlisted below.

1. Barton's Pendulum

A **Barton's Pendulum** experiment demonstrates the physical phenomenon of resonance and the response of pendulums to vibration at, below and above their resonant frequencies. In its simplest construction, approximately 10 different pendulums are hung from one common string. This system vibrates at the resonance frequency of a center pendulum, causing the target pendulum to swing with the maximum amplitude. The other pendulums to the side do not move as well, thus demonstrating how torquing a pendulum at its resonance frequency is most efficient.

All objects have a natural frequency of vibration or resonant frequency. If you force a system—in this case a set of pendulums—to oscillate, you get a maximum transfer of energy, i.e. maximum amplitude imparted, when the driving frequency equals the resonant frequency of the driven system. The phase relationship between the driver and driven oscillator is also related by their relative frequencies of oscillation.

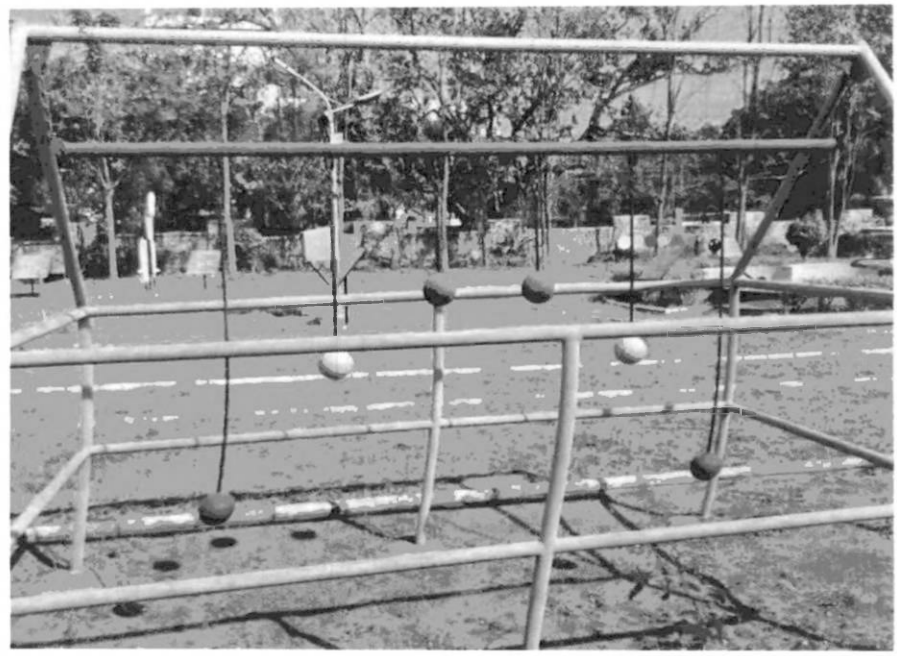

Fig. 45 : Barton's Pendulum

Fig. 46 : 3D Pendulum

2. Sundial

A **sundial** is a device that measures time by the position of the Sun. In common designs such as the horizontal sundial, the sun casts a shadow from its *style* onto a surface marked with lines indicating the hours of the day. The style is the time-telling edge of the *gnomon* (part of a sundial that casts the shadow), often a thin rod or a sharp, straight edge. As the sun moves across the sky, the shadow-edge aligns with different hour-lines. All sundials must be aligned with the axis of the Earth's rotation to tell the correct time. In most designs, the style must point towards true celestial north (not the north magnetic pole or south magnetic pole). That is, the style's horizontal angle must equal the sundial's geographical latitude.

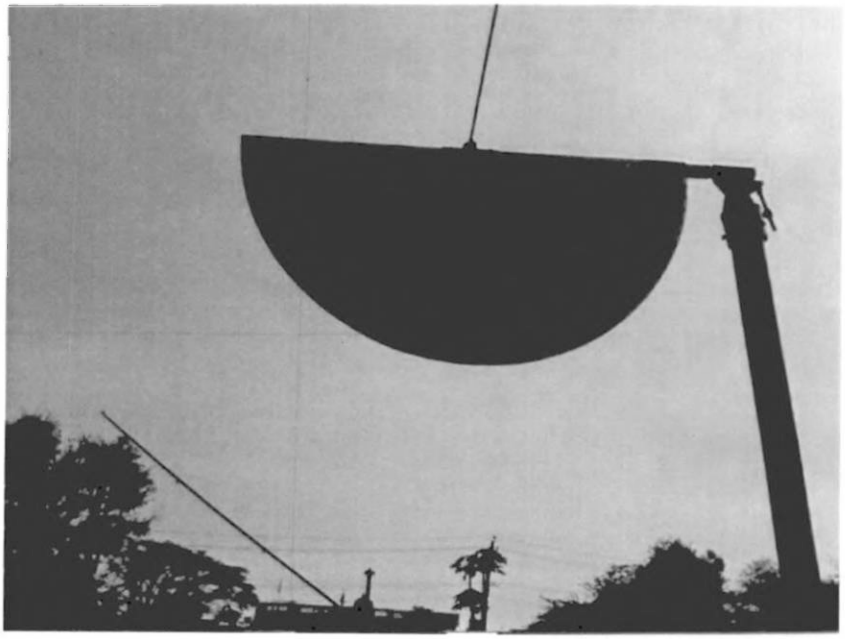

Fig. 47 : Sundial

3. Newton's colour disc

The perception of a picture or a colour stays in the human brain for a fraction of a second. Newton's colour disk is a mechanical device that rotates an array of colours arranged as petals or gradients around an axis and when the disc rotates fast enough the perception of the colour changes to white. This is because white light is nothing but the mixture of light of all wavelengths in the visible range. Sir Isaac Newton used this device to prove the above assertion that white colour is the mixture of all colours.

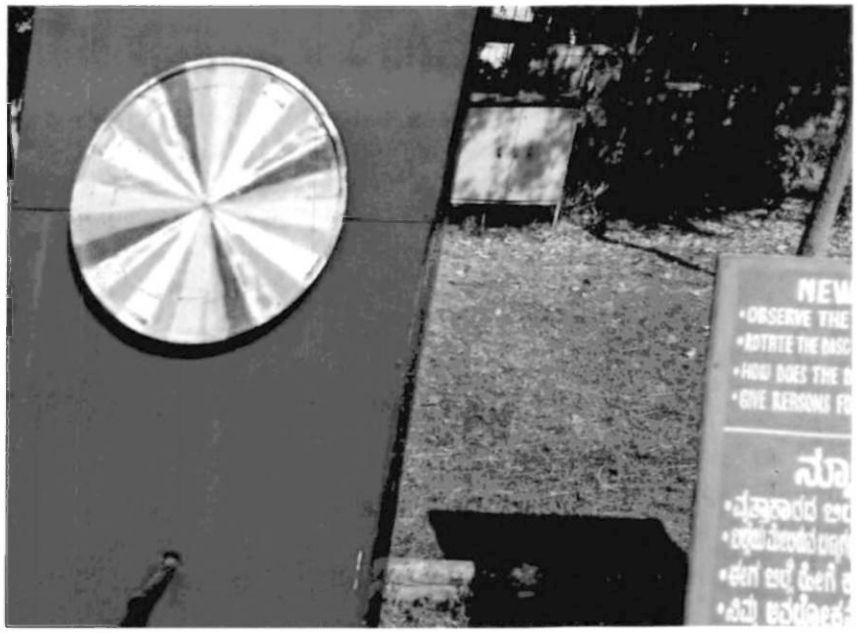

Fig. 48 : Newton's colour disc

4. Pulleys

A **pulley**, also called a **sheave** or a **drum**, is a mechanism composed of a wheel on an axle or shaft that may have a groove between two flanges around its circumference. A rope, cable, belt, or chain usually runs over the wheel and inside the groove, if present. Pulleys are used to change the direction of an applied force, transmit rotational motion, or realize a mechanical advantage in either a linear or rotational system of motion. It is one of the six simple machines.

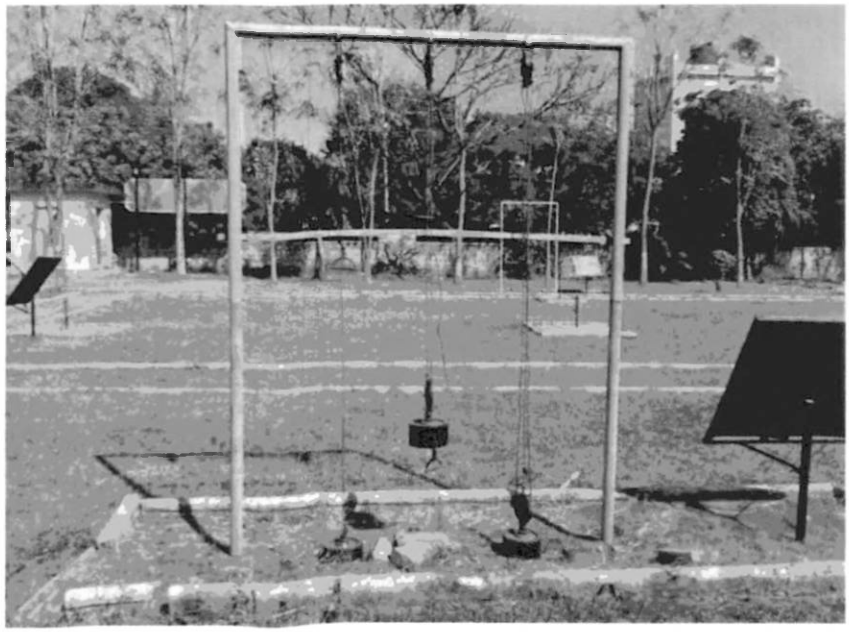

Fig. 49 : Pulleys

5. Projectile Motion

Projectile motion is the motion of an object whose path is affected by the force of gravity. We are all affected by gravity, but it profoundly alters the motion of objects that are thrown or shot upward. The arching of a thrown ball is caused by gravity, as well as its falling motion in general.

Gravity is a force that acts on objects; it makes objects accelerate "downward". While we do not need to know about forces to analyze projectile motion we do need to know a very important detail: **gravity causes objects to accelerate downward at roughly 9.8 m/s²** 9.8 m/s^2 is the generally accepted amount of acceleration that happens, in some areas of Earth it is more or less but we will use 9.8 for our calculations.

Projectile Motion

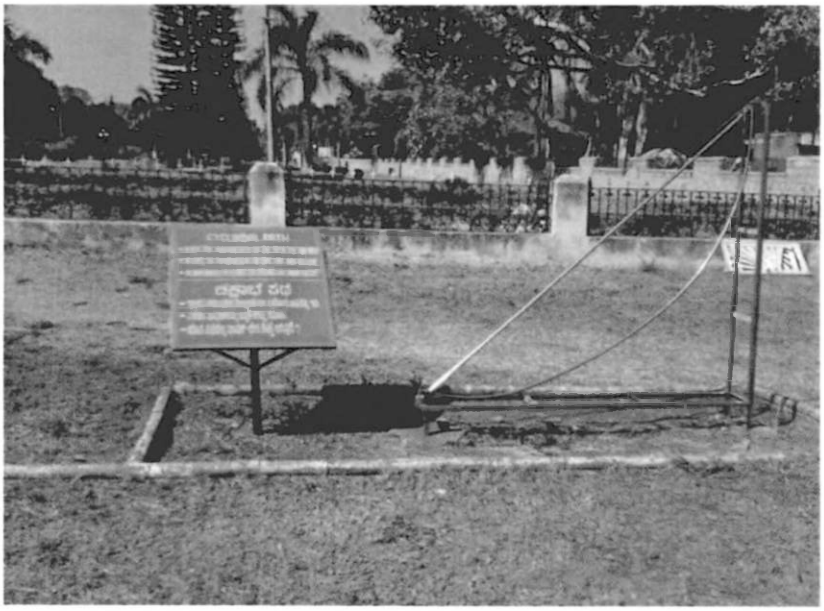

Fig. 50 : Projectile Motion

6. Swing

Swings work by converting potential energy into kinetic energy, then kinetic energy back into potential energy, over and over again.

The kinetic energy is the fast part of swinging; it's the speed you have as you rush back and forth. Potential energy is the high part of swinging.
The higher you go on the swing, the more potential energy you have.

Speed and Swing

Even though you're not moving at the very top of each swing, you can think of your height as your potential for speed. A physicist would say that your kinetic energy–that is, your speed–is "stored" as potential energy at the top of each swing. More height is more speed, just waiting to happen.

How Do You Increase The Energy?

You can increase the energy of your swing in two separate ways.

If someone pushes you, that increases your kinetic energy.

By pumping your legs, you can increase your potential energy. By raising your legs at the top of each swing, you can raise the overall center of mass of your body, effectively raising the height of your swing. Pump after pump, the energy you burn in your legs increases your swing's potential energy. That extra height will add up, giving you a wilder swing ride.

7. Persistence of vision

"Persistence of Vision" refers to the phenomenon where the retina retains an image for a brief split-second after the image was actually seen, and lends itself to animation by fostering the illusion of motion when we view images in closely-timed sequence to one another. We don't notice the fractional skips between images because that persistence fills in the momentary gap to make the motion seem seamless.

Persistence of vision is the phenomenon of the eye by which an after image is thought to persist for approximately one twenty-fifth of a second on the retina.

Fig. 51 : Persistence of vision

Some of the other set-ups and constructs were as picturised below.

8. Lever

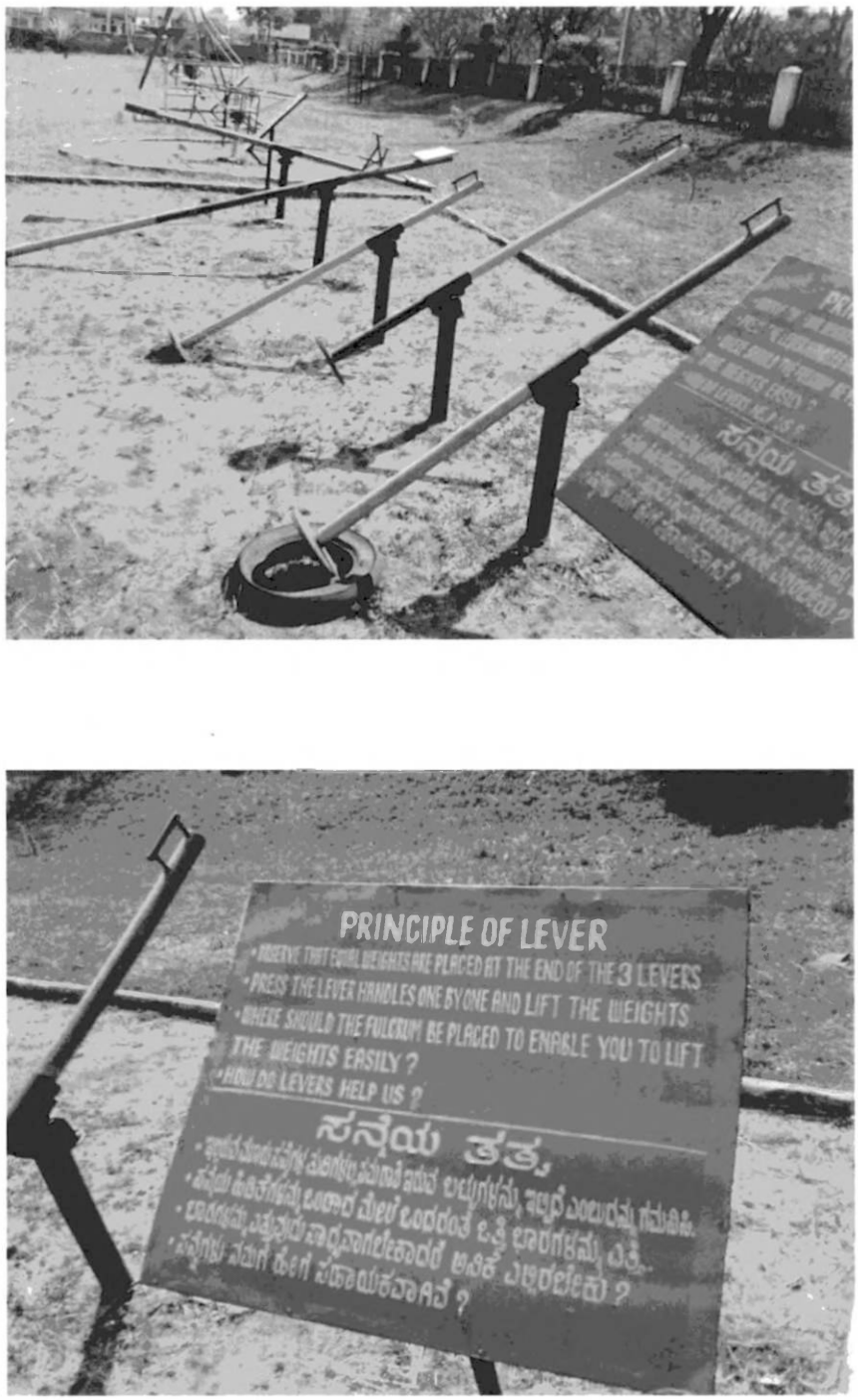

Fig. 52 : Lever

9. Gear Train

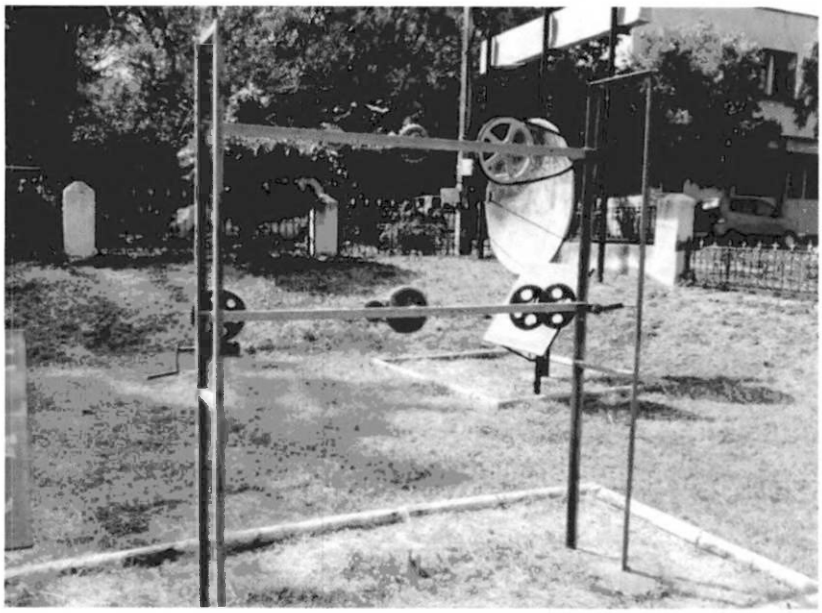

Fig. 53 : Gear Train

10. Conversion of Solar energy

Fig. 54 : Conversion of Solar energy

11. Archimedes screw

Fig. 55 : Archimedes screw

12. Depth perception

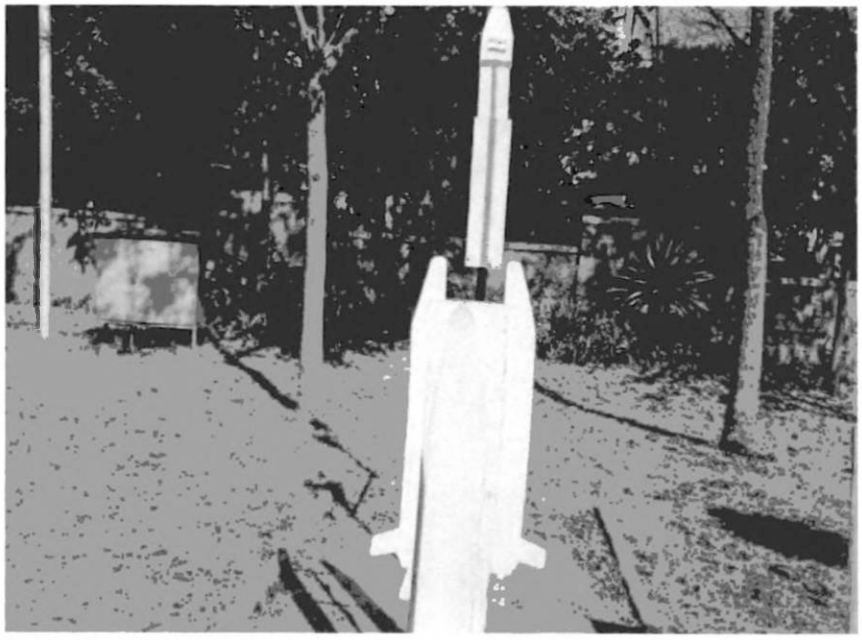

Fig. 56 : Depth perception

13. Musical pipes

Fig. 57 : Musical pipes

14. Heat perception

Fig. 58 : Heat perception

15. Angular momentum

Fig. 59 : Angular momentum

ESSAY WRITING: SHOULD THE SUN BE PAINTED BLACK?

RP: Dr. Geetha G Nair

1. An essay competition was conducted on this topic and winners with the best written essays were given prizes.
2. Two sets of views were expressed, one in favour and the other against. It was considered that the sun should be painted black because the sun is a ball of fire where Hydrogen is converted into Helium releasing lots of energy in the form of light, heat and other forms of energy(especially the former two). All stars die and turn into red giants and black-holes. This constant conversion into elemental helium makes the sun vulnerable of becoming a red giant some day. There are black spots on the sun probably where less of chemical reactions take place and therefore the contention that the sun should be painted black. When elemental conversions are over, a star changes in density and mass and turns into a black hole which swallows up all neighbouring/passing objects due to its intensified mass and gravitational force. Perhaps this justifies the fact that the sun should be painted black.
3. Another point of view was that it should not be painted black because it is the only source of energy for people on earth and it makes life possible on earth. Not only is it a source of energy like heat but also is a source of life. A frequent poser is what happens to the earth if the sun turns into a black hole? The sun is not massive enough to ever evolve into a black hole. The sun has been burning for 4 million years and will end its life in another 4.5 billion years as a white dwarf star. It is an interesting theoretical question but is not possible and therefore the sun should not be painted black.
4. Black holes are the evolutionary end points of massive stars 10 to 15 times as massive as the sun. If a star that is more massive than the sun undergoes a super nova explosion, it leaves behind a fairly massive burnt out stellar remnant. The remnant, collapses on itself because of no outward forces to oppose gravitational forces – it collapses to the point of zero and infinite density creating a 'singularity'. Around the singularity, the force of gravity is so strong that even light cannot escape. Thus no information can reach us from this region which is therefore called a black hole. The black hole can accrete matter into itself. Binary X-ray sources predict the presence of black holes eg., Cygnus-x.

Day – 7
4th October, 2011

Session IV
3.15 p.m. – 5.00 p.m.
***

VALEDICTION

OPINION AND FEEDBACK FROM SOME OF THE PARTICIPANTS AND TEACHERS

It's been a wonderful experience for all of us. Learning is made so much of fun through different activities. Everything is well organized and the resource persons are truely amazing. Looking forward to more such camps and interactions.

Thank You.

Shilpa Ramanna

Its really a good experience for all of us. Sessions here interesting and amazing. Resource persons are very good. I thoroughly enjoyed the sessions.

Thank You.

30/9.

It was and it is a beautiful and wonderful opportunity we have got. We all are very much benifitted by this Science club. The resource persons who are giving us all the info's are truely very amazing. Programme is well organised and we are enjoying learning and exploring science. Thank you for creating interest in learing Science.

Thanking you.

Savitha Ponnappa
B.V.B, Mysore.
Teacher.

I have learnt a lot here. They experienced me the wonderful concepts of Science. ~~Tell me~~ I never knew Science had so many interesting things till I attended this camp. Thank you so much. I expect more. interesting and knowlegeable things in this camp.

I am enjoying this science camp and learn a lot here. All the sessions are very interesting and something new. I expect more scientific topics and more enjoyable science camp further.

Shreelakshmi. B.
Bharatiya Vidya
Bhavan, Mysore.

It is very wonderful camp. We are learning more than I had taught and my ~~aim~~ aim is to become a Scientist and I will become by learning the Science camp of RIE

Sanjith. S.

REGIONAL INSTITUTE OF EDUCATION
(NCERT), MYSORE

CERTIFICATE

Chi./Kum. _____ studying in _____ Class of _____

_____ has actively participated in the Seven-day Science Camp for Schools organized at the Regional Institute of Education (NCERT), Mysore from 28th September to 4th October 2011.

(Geetha G. Nair)	(B.S. Upadhyaya)	(Premlata Sharma)
Programme Coordinator	Head, DEE	Principal

Evaluation of Science Camp

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EVALUATION OF SCIENCE CAMP

This was done using questionnaire tools and statistical analysis of the data obtained thereof. Two tools were prepared during the course of the seven day workshop.

Tool 1 is termed Needs Assessment Questionnaire and was administered to the student participants to gauge the requirement levels/needs levels/ expectation levels of the participants from the science camp. Every YES was assigned a score of +1 and the yeses totalled up to get maximum score out of 21 and mean value obtained.

Tool 2 is termed Content Achievement Questionnaire. This was administered to to test the level of knowledge and understanding attained during the science camp. Every YES was assigned a score of +1. Unattempted and both attempted questions were assigned 0 and the yesses totalled up to get maximum score out of 30; mean value was calculated.

Mean values of tool1 and tool2 were correlated.

It was found that need levels from the science camp was about 50% and this was highly significant. The content achievement was about 79% at the end of the Science camp and this also was found to be highly significant as evidenced by the data and statistical analyses given below.

TOOL – 1

Science Camp for Schools 2011-12

Needs assessment Questionnaire for students of science camp for schools 2010-11

Note : Please answer YES / NO by putting V mark and write in a sentence or two as to what you except to gain from the Science camp of RIE

1.	Is this the first Science Camp you are attending?	Yes/No
2.	Is Science as a subject useful in your day to day life?	Yes / No
3.	Do you have scientific activities in your school?	Yes / No
4.	Have you participated in a Science fair?	Yes / No
5.	Have you participated in a Science exhibition?	Yes / No
6.	Do you carryout Science Projects in your school?	Yes / No
7.	Do you have a Science club in your school?	Yes / No
8.	Have you participated in city / district /National level Exhibitions?	Yes / No
9.	Have you appeared for any competitive exam in Science?	Yes / No
10.	Are you appearing/have you appeared for NISE 8th Standard?	Yes /No
11.	Is learning Science fun? Is it a joyful experience?	Yes / No
12.	Can you do experiments independently?	Yes / No
13.	Have you worked in a Science Laboratory?	Yes/No
14.	Can you construct models for explaining scientific Concepts'?	Yes/No
15.	Can you participate in a debate in a Scientific topic of your interest & win?	Yes / No
16.	Have you even visited a Zoo?	Yes / No
17.	Have you seen a planetarium?	Yes / No
18.	Have you visited a museum?	Yes/No
19.	Have you visi ted KRS Dam /Gardens?	Yes / No
20.	Have you visited places of scientific interest in and around Mysore?	Yes / No
21.	Are you participating in this Science camp to further your Interest & knowledge of science?	Yes / No

TOOL – 2

Content Achievement Questionnaire

Time: 15 minutes

This questionnaire is framed to test/the knowledge and understanding gained during the Science Camp. Please tick (√) Yes/No.

1.	Is our planet in Danger?	Yes	No
2.	Dwarka is sinking in the sea	Yes	No
3.	Ozone hole over Antarctica allows UV rays to enter the earth's atmosphere	Yes	No
4.	Atmosphere is a protective umbrella for earth	Yes	No
5.	Green House effects generate heat	Yes	No
6.	Iodine solution turns starch blue - black	Yes	No
7.	Starch is present in bread	Yes	No
8.	Flower is a modified shoot	Yes	No
9.	Ovary is the female part of flower	Yes	No
10.	Stamen is made of anther & filament	Yes	No
11.	Terrakota is dried clay	Yes	No
12.	You can light paper by dipping wet finger in alcohol.	Yes	No
13.	Sea Horse is a fish	Yes	No
14.	White tigers are extinct.	Yes	No
15.	Peacock is our National bird	Yes	No
16.	Tortoises and turtles are reptiles	Yes	No
17.	Depression is a mental health problem	Yes	No
18.	Temper tantrums show maladjustment	Yes	No
19.	There are 1750 types of Butterflies.	Yes	No
20.	2010 is International Year of Bio-diversity	Yes	No
21.	1.75 million living species are described by scientists	Yes	No
22.	Tortoise lives for only 100 years	Yes	No
23.	Plastination preserves organs	Yes	No
24.	Plastination is done using polymers	Yes	No
25.	Orinthology is study of reptiles	Yes	No
26.	Acids turn blue litmus red	Yes	No
27.	Pasteurisation of milk is done at 71.5°C	Yes	No
28.	Agmark is symbol of purity for Nandini dairy products	Yes	No
29.	9 is a magical number	Yes	No
30.	Humans have 46 chromosomes	Yes	No

Table – 5 : T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
TOOL2	27	23.7407	3.33504	.64183

One-Sample Test

	Test Value = 30			
	t	df	Sig. (2-tailed)	Mean Difference
TOOL2	-9.752	26	.000	-6.2593

Mean content achievement of the sample selected was 23.74. One sample t test revealed a significant difference between the expected standard value of 30 with the significance level of .000. A deficit of 6.25 scores was observed.

Table – 6 : T-Test

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
TOOL1	25	12.9600	4.69468	.93894

One-Sample Test

	Test Value = 21			
	t	df	Sig. (2-tailed)	Mean Difference
TOOL1	-8.563	24	.000	-8.0400

Mean needs assessment of the sample selected was 12.96. One sample t test (t=8.563; P=.000) revealed a significant difference between the expected standard value of 21 with the significance level of .000. A deficit of 8.04 scores was observed.

Table – 7 : Correlations

Variable 1	Variable 2	Correlation coefficient	Significance
content achievement	needs assessment	**0.556**	**.014**

A significant and positive correlation observed between content achievement and needs assessment scores with the r value of 0.556 and significance level of .014.

Table – 8 : T-Test

Group Statistics

	SEX	N	Mean	Std. Deviation	Std. Error Mean
TOOL 2	M	13	23.0000	3.76386	1.04391
	F	14	24.4286	2.84779	.76110
TOOL 1	M	11	13.6364	4.73862	1.42875
	F	14	12.4286	4.76710	1.27406

Independent Samples Test

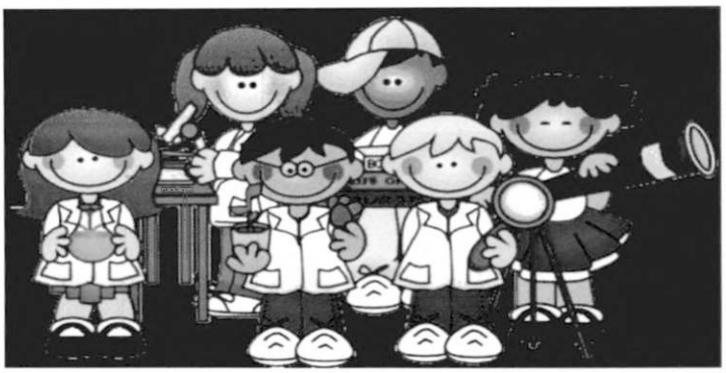
	t-test for Equality of Means			
	t	df	Sig. (2-tailed)	Mean Difference
TOOL 2	-1.117	25	.274	-1.4286
TOOL 1	.630	23	.535	1.2078

Male and female students did not differ significantly in their mean scores on content achievement and needs assessment scores as both the t values failed to reach significance level criterion of .05 level.

Table – 9 : Data giving scores obtained

	Tool 2		Tool 1	gender
Hari prassad	29			1
Jayalakshmi	22		10	2
Amitha	28			2
Supreetha	22			2
Shree Lakshmi	30		12	2
Ujwal	27		19	1
Ambika	23		6	2
Meghana	22		8	2
Prajanna	24		10	2
Nisarga	23		7	2
Pooja	23			2
Anupama				2
Chandru	22			1
Damodar	23			1
Mohan	22			1
Kumar	22			1
Prashanth	21		8	1
Ravi	14		8	1
Suhan	26		18	1
Tulagi	23		7	1
Baniitha	24		7	2
Faraz	21		10	2
Jyothika	28		19	2
Pruthvi	24		18	2
Soraya	28		17	2
Mandana	21		17	1
Amogh	27		18	1
Sanjith	22		9	1
Shilpa			19	2
No name			17	1
No name			16	2
No name			13	1
Savitha			15	2
Bhuvaneshwar			16	1

LIST OF STUDENT PARTICIPANTS



Sl. No.	Name of the student	Standard	School
1.	N Meghana	7th std.	GHPS Yelawala, Mysore
2.	Niraja S	6th std.	GHPS Yelawala, Mysore
3.	Ambika S	6th std.	GHPS Yelawala, Mysore
4.	Prashanth R	6th std.	GHPS Yelawala, Mysore
5.	Ravi K	6th std.	GHPS Yelawala, Mysore
6.	Ujwal Narayan N	7th std.	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
7.	Amogh Chandrashekar	7th std.	B . V. B. K. V. Madikeri
8.	Mandana M K	6th std.	B . V. B. K. V. Madikeri
9.	Sarayu Ianath	8th std.	B . V. B. K. V. Madikeri
10.	Jothika K T	8th std.	B . V. B. K. V. Madikeri
11.	B Suhan Bhumaiah	7th std.	B . V. B. K. V. Madikeri
12.	Pruthvi H P	6th std.	Bharatiya Vidya Bhavan, Mysore
13.	Sanjith S	7th std.	Bharatiya Vidya Bhavan, Mysore
14.	Hari Prasad H	8th std.	Bharatiya Vidya Bhavan, Mysore
15.	Amitha J Gowda	7th std.	Bharatiya Vidya Bhavan, Mysore
16.	Shreelakshmi B	8th std.	Bharatiya Vidya Bhavan, Mysore
17.	R Supreetha Reddy	6th std.	Bharatiya Vidya Bhavan, Mysore
18.	Jayalakshimi R	7th std.	G.H.P.S. Hinkal, Mysore
19.	Tulasi V	7th std.	G.H.P.S. Hinkal, Mysore
20.	Ranjitha R	6th std.	G.H.P.S. Hinkal, Mysore
21.	Prasanna M	7th std.	G.H.P.S. Hinkal, Mysore
22.	Mohammed Faraz	7th std.	G.H.P.S. Hinkal, Mysore
23.	Premkumar R	7th std.	G.H.P.S. Hebbal, Mysore
24.	Dhamodara	7th std.	G.H.P.S. Hebbal, Mysore
25.	Chandru P	7th std.	G.H.P.S. Hebbal, Mysore
26.	Mohan M	7th std.	G.H.P.S. Hebbal, Mysore
27.	Pooja T	7th std.	G.H.P.S. Hebbal, Mysore
28.	Anupama S	7th std.	G.H.P.S. Hebbal, Mysore

LIST OF TEACHERS ACCOMPANYING THE STUDENTS

Sl. No.	Name of the Teachers	School
1	Savitha Ponnappa	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
2	Shilpa Ponnamma	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
3	Priya T A	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
4	Jayashri T	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
5	Sumithra K S	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
6	Ponnamma P S	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
7	Selomi Sheela	Bharatiya Vidya Bhavan Kodagu Vidayalaya Madikeri
8	Rani D S	GHPS Yelawala, Mysore
9	C P Bhuvaneshwari	G.H.P.S. Hinkal, Mysore
10	Hemalatha	G.H.P.S. Hebbal, Mysore
11	Shruthi	Bharatiya Vidya Bhavan, Mysore

REFERENCES

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2. http://en.wikipedia.org/wiki/file
3. http://www.answers.com.

IP - 06

Annexure II

Programme Proposal

ABSTRACT

1. **Title of the Programme** : Summer Science Camp for Students of Rural Upper Primary Schools

2. **Type :** (Research/Development/ Training/Extension/Development-cum-Training Etc) : Training

3. **Category** New/On-going/Carried Over (If new, give justification in brief, if on-going/carried over mentioned the progress) : On-going

4. **Specific Objectives** :

   (i) To acquaint students with Science Activities

   (ii) To enable students to get hands-on-experience of Science Activities

   (iii) To develop scientific temper and attitude, foster creativity & joyful learning

5. **Methodology** :

   (i) Utilization of Lab facilities, RIEM

   (ii) Construction of Models, slide shows

   (iii) Debates & Discussions

   (iv) Visits to surrounding places/Institute of Scientific Interest

6. **Budget Proposed** : ₹ 1,37,000

7. Plans for Utilization and Dissemination of the end product(s) : Preparation and submission of a report

IP - 06

REGIONAL INSTITUTE OF EDUCATION (NCERT): MYSORE – 570 006
(National Council of Educational Research and Training, New Delhi)

DETAILED PROGRAMME PROPOSAL

1	Name of the NCERT Constituent/Department	RIE, Mysore.
2	Title of Programme	Summer Science Camp for Students of Rural Upper Primary Schools
3	(a) Type of the Programme (Research/Development/Training/Extension / Development cum Research Etc.)	Training
	(b) Category of the programme (New/On-going/Carried over)	Ongoing
	(c) If the programme is on-going or carried over mention the PAC code No. and Year of Approval	
4	Total Duration of the Programme as Phased in col. 10 a (Months)	Three months
	(a) Date on which programme commenced/to be commenced	May, June 2011
	(b) Target Date of completion	July 2011
5	Target Groups	
	(a) If the Programme is meant for a group with special needs (Special groups, SC.ST, Minority, Girls etc)	
	(b) Stage of Education to which the programme is meant (Pre-Primary, Primary, Upper Primary, Secondary, Senior Secondary, Tertiary, Any other)	Upper Primary
	(c) If programme is State/Region/Agency specific, please specify.	Karnataka
6	Beneficiaries	Students of DMS and others

7. **Need and Justification**
(If an Ongoing/Carried over programme, please also state briefly the progress achieve the work likely to complete by the end of the current financial year)

Rural areas do not have well equipped science labs nor other infrastructural facilities for teaching or experimenting in science nor do they have access to appropriate teaching-learning resource materials.

8. **(a) Specific Objectives:**

1. To acquaint students with science activities
2. To enable students to get hands-on-experiences on science activities
3. To develop scientific temper and attitude, foster creativity & joyful learning

(b) Methodology:

(i) Utilization of Lab facilities, RIEM

(ii) Construction of Models, slide shows

(iii) Debates & Discussions

(iv) Visits to surrounding places/Institute of Scientific Interest

9. Collaborating Agencies (if any)	Name of Agency	Nature of Collaboration
(a) NCERT Constituents	DMS	
(b) Outside Agency	RMNH (Regional Museum of Natural History, Mysore) Chamarajendra Zoological Garden (Mysore)	

10. (a) Phasing of Programme with precise information on Activities (including in house-activities involving expenditure of otherwise clearly indicating the methodology to be followed)

Sl. No.	Activities Proposed to be organized	Proposed Dates	Estimated Expenditure
1.	Camp activities and visits	May, June 2011 (Seven days)	1,35,000
2.	Preparation of Report	July 2011	2,000
		TOTAL	**1,37,000**

10. (c) Total Expenditure (10a + 10b) = ₹ 1,37,000

Amount required in the proposed year Rupees One Lakh Thirty Seven Thousand Only

11. Detail of each Budget Activity under Item No. 10(a) (in the following format)

11.1 **Activity No.** : 1
Title : **Camp activities and visits**
Proposed Date :

Sl. No.	Item of Expenditure	Estimated Expenditure	Remarks if any
1	Brochure	2,000	
2	TA for 10 Resource Persons (Rs.4000X10)	40,000	
3	DA for 10 Resource Persons (Rs.250X10x2)	5,000	(Working Lunch & Refreshments)
4	Accommodation (Rs.40X7X4)	1,120	
5	Local Conveyance (Rs.100X7X4)	2,800	
6	Honorarium (Rs.1000X7Xx)	21,000	
7	Working Lunch & Refreshments (Rs.80X40X7)	Rs.22,400	For Local RPs & Participants
8	Materials	25,000	
9	Visits	10,000	
10	Miscellaneous	5,680	
	TOTAL	**1,35,000**	

11.2 **Activity No.** : 2
Title : Preparation of report
Proposed Date :

Sl. No.	Item of Expenditure	Estimated Expenditure	Remarks if any
1.	Preparation of Report	**2,000**	

12. **Scheme of Evaluation** :

To be carried out through the administration of a questionnaire to administer effectiveness

13. **Dissemination of the findings :**
Submission of a report

14. **Plans for follow up/Feed back on utilization of the outcome**
Performance of students as reported by Heads of Schools participating

15. a) **Name and Designation of the Programme Coordinator:**
Dr.Geetha G Nair
Associate Professor

b) **Name(s) and Designation(s) of other faculty member(s) involved**

TGTs from DMS
Botany & Zoology Staff

Signature of the Head, Department

Date :

Signature of the Programme Coordinator

Date : January 2011