

# **SUMMER SCIENCE CAMP 2006**

**(15.5.2006 TO 22.5.2006)**

## **A REPORT**

**Dr. P.R.Lalitha**

Convener, Exploratory Laboratory

&

Coordinator, Summer Science Camp



**REGIONAL INSTITUTE OF EDUCATION**  
**[National Council of Educational Research and Training]**  
**Mysore 570 006**

**May 2006**

## CONTENTS

	<b>Page Nos.</b>
Preface	1
Resource Persons	3
List of Participants	5
Time Table	6
Eye Care	7
Fun with Mathematics	15
Adulteration of Food – A Social Evil	19
Astronomy	24
What makes Paper Airplanes fly ?	30
Yoga and Healthy Living	36
Nature Walk	38
Snakes	42
Birds	45
Towards Becoming a Scientist	47
Physics Activities	60
Science Quiz	64
Views of students	66

## PREFACE

### SUMMER SCIENCE CAMP

The NCF 2005 emphasises the need to engage students at the upper primary stage in learning of science through familiar experiences, working with hands and continue to learn more about environment and health through activities. Science concepts are to be arrived at mainly from activities and experiments. There is a need to empower children to learn science through group activity, discussion with peers, exhibitions, nature walk etc. Keeping this in mind, to kindle children's interest in science and develop scientific temper, a Summer Science Camp was organized for students of VI and VII standards from May 15<sup>th</sup>, 2006 to May 22<sup>nd</sup>, 2006 at the Regional Institute of Education, Mysore. The participants were drawn from DMS, Vijaya Vittala Vidyashala, Mansarovar Pushkarni School, Rotary West School, Mahabodhi School and DMS from Mysore, and St. Joseph's School, Mercara. The camp was organized as a part of the activities of the Exploratory Centre of the Institute, with the following objectives:

- ❖ to allow children to have hands on experience on varied activities in science
- ❖ to plan an investigation and explore
- ❖ to allow them to unfold the different concepts on their own
- ❖ to develop the ability to observe keenly
- ❖ to develop scientific temper
- ❖ to prepare models
- ❖ to see the relevance of the science they learnt in the classroom in their day to day life

The Camp was inaugurated by Prof. G Ravindra, Joint Director, NCERT, New Delhi. Prof. G.T.Bhandage, Dean & Head DESM, Regional Institute of Education, Mysore, presided. Prof. Ravindra in his inaugural address mentioned that taking part in such camps would bring children closer to the pursuit of science as a career and enhance their creative potential. Prof. Bhandage highlighted the importance of such camps and explained the important role played by experimentation in science.

The topics addressed during the Camp were of a varied nature ranging from Food Adulteration, Wildlife, Birds & Bird Watching, Eye Care, Nature walk, Computer Animation, Yoga, Physics, Chemistry and Biology Activities, Fun with Mathematics, Investigatory Projects, Astronomy and Clay modeling to Aerodynamics and building Palm held Airplanes.

The consequences of eating adulterated food was explained in the session on Food Adulteration and students simple did experiments to identify the adulterants in food materials bought from the shops. Wildlife was introduced through slides as a part of the Zoo Outreach Activities and students were made aware of the importance of protection of wildlife and the wildlife protection acts. Snake Shyam showed a number of snakes which was quite informative. Students had many questions to ask him like: Does the snake have a heart ? If so, where is it located ?. How do snakes reproduce ?. In the session on Fun with Mathematics simple activities were given with numbers involving magic squares, multiplication, puzzles etc., to create an interest in mathematics.

Who does not like our winged friends?! The beautiful feathered friends were introduced both through a slide show and bird watching at the Karanji Lake. Common injuries, common defects and care of the eye was discussed by Dr. Manikarnika. Children answered questions of how injuries are caused commonly, based on their experience. The eyes of the students were also examined and some of them were also advised to wear spectacles.

The importance of experimentation, observation, collection of data and inferring was illustrated by Mr. C.G. Nagaraja through simple projects which the students performed and made a presentation. In the session on Astronomy how day and night are caused, the seasons, retrograde motion of planets and the celestial sphere were discussed through simple models. Simple experiments were performed by students in the Physics, Chemistry and Biology laboratories. During nature walk conducted by Mr. Srinivas of the Natural History museum, children identified different plants and learnt their botanical names, observed different insects and their habitat. Their observations were presented during the group discussion held subsequently.

Airplanes! are a joy to observe in flight. Mr. Sastry a specialist in Origami made children prepare different paper planes and introduced them to the elements of aerodynamics during the session on Palm Held Planes. Children enjoyed flying the planes they made. Principles of Animation using computers was explained by Prof. Rajaram Sharma while the importance of Yoga and Breathing exercises was dealt with by Mr. Venkatachala. The participants of the camp visited the Science Park. A written quiz competition was conducted in which Mythri K.Rao of Vijaya Vittala Vidyashala, V. Jayanth and N. Ashwini of DMS, secured the I, II and III prizes.

The Valedictory function was held on the 22<sup>nd</sup> of May, when Dr. P.R.Lalitha, Convenor of the Exploratory Centre and Academic Coordinator of the camp gave a brief report of the activities conducted during the camp. The participant children expressed their views about the camp. They felt that during such camps they had better opportunity to express their views freely. They hoped that they would have many more opportunities to participate and that the other students would also be benefited by such camps. Prof. G. T Bhandage in his valedictory address said that he was happy to note that the children actively participated in all the activities and advised them to further their thinking and find out more about what they learnt during the camp. He also gave away the certificates and prizes to the participant children. A skit on the hazards of use of plastics was enacted as a fitting finale to the Camp by Sri. Uday Kumar and troupe.

**P.R.Lalitha**  
**Convenor, Exploratory Centre**  
**& Academic Coordinator**  
**Summer Science Camp**

## RESOURCE PERSONS

### EXTERNAL RESOURCE PERSONS

Prof. Saraswathi,  
Department of Food and Nutrition,  
University of Mysore,  
Mysore.

Mr. C.G.Nagaraj,  
Principal,  
Mahabodhi School,  
Swimming Pool Road,  
Mysore

Snake Shyam,  
259, 5<sup>th</sup> A Main,  
Brindavan Extension,  
Mysore.

Prof. K.B.Sadanand,  
11, Temple Road,  
Jayalakshmipuram,  
Mysore.

Mr. Kunigal Ramaswamy  
Lecturer,  
Government Junior College,  
Kunigal.

Dr. H.R.Manikarnika,  
Principal, Health and Family Welfare Centre,  
Mysore.

Mr. A.V.Sastry,  
520, II Cross,  
Jayanagar,  
Kolar.

Mr. J Srinivas,  
Natural History Museum,  
Mysore.

Mr. Viswanatha Rao,  
Retired Teacher,  
Bangalore

## **INTERNAL RESOURCE PERSONS**

Prof. P.R.Lalitha,  
Professor of Physics,  
RIE, Mysore.

Prof. B.S.Raghavendra,  
Prof. of Chemistry,  
RIE, Mysore.

Prof. Rajaram S. Sharma,  
Prof. Of Education,  
RIE, Mysore.

Dr V.V. Anand,  
Reader in Botany,  
RIE, Mysore.

Dr. V Venkatachala,  
Physical Education Teacher,  
DMS, Mysore.

**SUMMER SCIENCE CAMP 2006  
LIST OF PARTICIPANTS**

Sl. No	Name	Class	15th	16th	17th	18th	19th	20th	21st	22nd
<b>DMS, Mysore</b>										
1.	Sumukha M.S.	VIA								
2.	Sagarika Kashyap									
3.	Varsha R									
4.	Vasudha									
5.	Jayanth V									
6.	Janhavi R Bhat									
7.	Sripriya M.R.									
8.	Raghavendra Rao Shinde	VIB								
9.	Pratosh Baga									
10.	Yashaswini N.									
11.	Vivek Mishra									
12.	Sharath N.									
13.	Sahana S.									
14.	Hemavathi S.									
15.	Bharathi S.									
16.	Niveditha C.									
17.	Gagan C. S.									
18.	Akshay Kumar S.									
19.	Varsha V.									
20.	Naveen R.									
21.	Chiranjeev Nayaka G.S.									
22.	Akshay J.M.									
<b>Rotary West School, Mysore</b>										
23.	Abhishek A.	VI								
24.	Saarang Suresh									
25.	Samskruthi Suresh									
26.	Narendra M.									
27.	Chandrashekhar M.									
28.	Vybhavi S.R.									
29.	Uttam Vasishth	VII A								
30.	Vinay Kumar	VII								
<b>Vijaya Vittala Vidyashala, Mysore</b>										
31.	Mythri K.Rao.	VI								
32.	Kaushik K.R.									
33.	Prajwal Nag M.									
<b>Mahabodhi School, Mysore</b>										
34.	Navo	VI								
35.	Ashrish B									
36.	Satho									
37.	Sujaya									
38.	Sothi									
<b>Mansarovar Pushkarni School, Mysore</b>										
39.	Vishrutha Rao	V								
<b>St.Joseph's School, Mercara</b>										
40.	Pushkarni M M	VII								
41.	Samruddhi Kishore									

**REGIONAL INSTITUTE OF EDUCATION, MYSORE**  
**SUMMER SCIENCE CAMP – 2006**  
**(Timetable)**

<b>Day &amp; Date</b>	<b>9.30am –11.15am</b>	<b>11.30am-1.00pm</b>	<b>2.00pm-3.00pm</b>	<b>3.00pm-4.00pm</b>
<b>15/5/06 Mon</b>	Inauguration	Eye care Dr. Manikarnika	Science Projects C.G.Nagaraja	
<b>16/5/06 Tue</b>	Mathemagic Viswanatha Rao	Food Adulteration Dr. Saraswathi	Astronomy Kunigal Ramaswamy	
<b>17/5/06 Wed</b>	Nature Walk K.J.Srinivas		Experiments BSR+PRL	
<b>18/5/06 Thurs</b>	Yoga Parvatammanni	Computer Rajaram Sharma	Slide show birds K.B.Sadanand	Snakes Snake Shyam
<b>19/5/06 Fri</b>	Bird watching PRL+KBS+VVA		Zoo Outreach Activities	
<b>20/5/06 Sat</b>	Environmental Education VVAnand		Experiments VVAnand	
<b>21/5/06 Sun</b>	Palm Held Aeroplane A.V.Sastry			
<b>22/5/06 Mon</b>	Science Park PRL	Project Presentation	Skit on Environment	<b>Valedictory</b>

## EYE CARE

**Dr H.R.Manikarnika,  
Principal  
Health and Family Welfare Centre,  
Mysore**

"Oh, something is wrong with my eye!" We have all said this at some time. How uncomfortable it can be! Fortunately, many common eye (ocular) disorders disappear without treatment or can be managed by self-treating. Various products--from artificial tears and ointments to ocular decongestants--are available over-the-counter (OTC). These products can help with dryness, itching, or excessive watering of the eye. However, a word of caution: in some instances, what may seem like a minor eye problem may lead to a severe, potentially blinding condition.

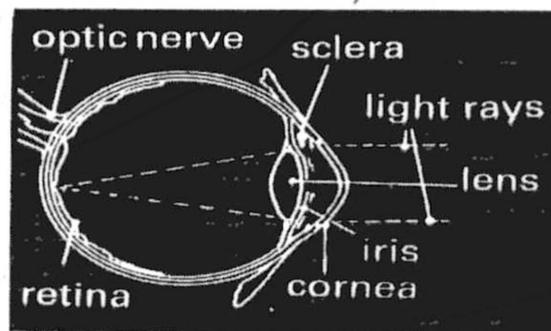
Many safe and effective OTC products for eye disorders are available for self-treatment. Two important factors to remember when considering self-treatment are: (1) if the problem appears to involve the eyeball itself, you should consult a physician immediately; and (2) if you use an OTC eye care product for 72 hours without improvement of the condition being treated or the condition worsens, you also should see a doctor immediately.

To self-treat common ocular disorders with OTC eye care products, viewers should understand: (1) the structure of the eye; (2) the cause of the disorder; (3) which disorders are safe to self-treat and which should be referred to a physician; (4) the types of OTC eye care products that are available and the disorders in which they are useful.

### **What is the structure of the eye?**

The eyes are complex sensory organs. They are designed to optimize vision under conditions of varying light. Their location, on the outside of the face, makes them susceptible to trauma, environmental chemicals and particles, and infectious agents. The eyelids are the major protective mechanism for the eye.

The eye consists of the eyeball, the upper and lower eyelids, and the conjunctivas.



The eyeball consists of a clear, transparent dome at the front (the cornea) that is surrounded by the white of the eyeball (the sclera). The iris of the eye is the circular,

colored portion within the eyeball and behind the cornea, and the pupil is the central opening within the iris. Behind the iris and pupil is the eye's lens.

The inner sides of the eyelids which touch the eyeball, are covered by a thin membrane (the palpebral conjunctiva) that produces mucus to lubricate the eye. This thin membrane folds back on itself and covers the visible sclera of the eyeball. (This continuation of the palpebral conjunctiva is called the bulbar conjunctiva.) The tissue between the skin of the eyelid and the palpebral conjunctiva is filled with glands that secrete sebum, an oily substance that provides additional lubrication for the eye. Tears are formed by the lacrimal gland in the upper, outer corner of the eye and are collected and drained by the lacrimal sac in the inner, lower corner of the eye. Natural oil for the tears is produced by tiny glands located at the corners of the eyelids.

### **Which common disorders of the eye can (sometimes) be self- treated?**

**Blepharitis:** Blepharitis is a common condition that is caused by inflammation of the eyelid. It results in red, scaly, and thickened eyelids and typically some loss of the eyelashes. Blepharitis may be due to either *Staphylococcus epidermidis* or *Staphylococcus aureus* (types of bacteria), or seborrheic dermatitis (a type of skin inflammation of unknown cause), or a mixture of the two. The most common complaints are itching and burning. Blepharitis is initially treated by applying hot compresses to the affected eye, followed by an eyelid scrub. If the condition persists, you should see the doctor, who may prescribe antibiotics.

**Lice:** The eyelids can become infested with one of two different lice, the crab louse (*Phthirus pubis*) or the head louse (*Pediculus humanus capitis*). Lice in the eyelids cause symptoms and signs that are similar to those of blepharitis (red, scaly, and thickened eyelids, usually with some loss of the eyelashes). Petrolatum or a non-medicated ointment is applied to the eyelid and suffocates the lice eggs. RID, NIX, A-2000 or any other preparation that is designed for use in the hair should not be used near the eyes.

**Contact dermatitis:** Contact dermatitis is an inflammation of the skin that causes swelling, scaling, or redness of the eyelid with intense itching. This condition usually is triggered by the use of a new product (soap or make-up) or exposure to a foreign substance. If both the upper and lower eyelids are affected, the cause of the inflammation is likely to be an allergic reaction. Antihistamines that are taken by mouth can be used to treat contact dermatitis of the eyelid.

**Foreign substance:** Lint, dust, an eyelash or other foreign matter can become stuck in the eye. When the substance cannot easily be removed either with your finger, water, or an ophthalmic irrigant, a doctor should be seen.

**Thermal damage:** Thermal damage is a burn injury to eye itself. Exposure to the sun's UV radiation during outdoor activities is an example of minor ocular thermal damage. An eye lubricant can be applied to soothe the eye. If there is no relief to the eye after 24 hours, a physician should be seen. An injury to the eye, for example, from a welder's arc, warrants the immediate attention of a doctor.

**Conjunctivitis:** Bacteria, virus, allergy or inflammation- promoting agents can cause inflammation of the palpebral and bulbar conjunctiva, also known as conjunctivitis. The inflammation causes enlargement of the blood vessels in the conjunctiva ("congestion") and causes the conjunctiva to become red ("blood-shot"). Itchy eyes may or may not accompany the inflammation. The congestion and itchiness can be treated with ocular decongestants, but the underlying cause may need treatment as well.

**Dry eye:** Dry eye is characterized by a white or mildly reddened eye combined with a sandy, gritty feeling. Unlike what the name implies, dry eye is accompanied by excessive tearing. Abnormalities of the tears or the lubricants of the eye themselves are thought to reduce the effectiveness of the lubrication. The resulting inadequate lubrication stimulates an increase in the production of tears. Other factors thought to contribute to dry eye are aging and some drugs such as antihistamines, antidepressants, or diuretics (water pills). A different type of dry eye can occur when the flow of tears is reduced because of inflammation and destruction of the lacrimal glands (keratoconjunctivitis sicca). Although lubricants are effective for treating dry eye, a physician also should be consulted.

**Hordeolum:** Commonly referred to as a sty, a hordeolum is an inflammation of the glands within the eyelid. The primary sign of a hordeolum is a tender, raised nodule on the eyelid. Sometimes, the eyelid is so swollen that the eye appears to be completely shut. A hordeolum is usually caused by the same bacteria that are linked to blepharitis. Treatment usually is with hot compresses several times per day, but if the problem worsens or does not clear within a week, a physician should be seen. Antibiotics may be necessary.

**Chalazion:** A chalazion looks similar to a hordeolum. A chalazion is a raised nodule without the tenderness of a hordeolum. Like a hordeolum, it is treated with hot compresses. If the chalazion persists, a physician should be consulted.

**Amblyopia** is reduction or dimming of vision in an eye that appears to be normal.

**Floaters** appear as spots, dots or lines and affect or interrupt vision and are usually caused by bits of debris in the vitreous humor.

**Iritis** is an inflammation of the iris of the eye.

**Retina Detachment** is the separation of the retina from the back of the eye.

**Strabismus** is crossed eyes.

## **Refractive Errors**

### **What are refractive errors?**

The following are the most common refractive errors, all of which affect vision and require lenses or surgery for correction or improvement:

- **Astigmatism**  
This is a condition in which there is an abnormal curvature of the cornea

making it no longer symmetrical. Astigmatisms cause blurred vision and eye strain and may be combined with nearsightedness or farsightedness. Eyeglasses or contact lenses are often prescribed to correct or improve the condition.

- **Hypermetropia**

Commonly known as farsightedness, hypermetropia is the most common refractive error in which an image of a distant object becomes focused behind the retina, either because the eyeball axis is too short, or because the refractive power of the object is too weak. This condition makes close objects appear out of focus and may caused blurred vision for objects at a distance, headaches, and/or eye strain. Eyeglasses or contact lenses are prescribed to correct or improve the condition.

- **Myopia**

Commonly known as nearsightedness, myopia is a condition in which, opposite of hyperopia, an image of a distant object becomes focused in front the retina, either because the eyeball axis is too long, or because the refractive power of the object is too strong. This condition makes distant objects appear out of focus and may caused blurred vision for objects at close range, headaches, and/or eye strain. Eyeglasses or contact lenses are prescribed to correct or improve the condition.

- **Presbyopia**

Another type of farsightedness, presbyopia is caused when the center of the eye lens hardens making it unable to accommodate near vision. This condition generally affects almost everyone over the age of 50 -- even those with myopia. Eyeglasses or contact lenses are prescribed to correct or improve the condition.

### **What common eye conditions usually require treatment by a doctor?**

**Trauma:** Blunt trauma to the eye requires immediate evaluation by an ophthalmologist or optometrist. Trauma to the eye can activate bleeding into the eye from ruptured blood vessels or cause detachment of the retina. Both situations can seriously impair vision.

**Abrasion:** An abrasion usually occurs when a fingernail or metallic foreign object rubs across the cornea or conjunctiva. There is a risk of bacterial or fungal contamination and infection following an eye abrasion.

**Chemical exposure:** Exposure of the eye to household cleaning solutions, fumes, or an actual chemical splash requires immediate evaluation by a physician, though initially it may be self- treated with water or an irritant.

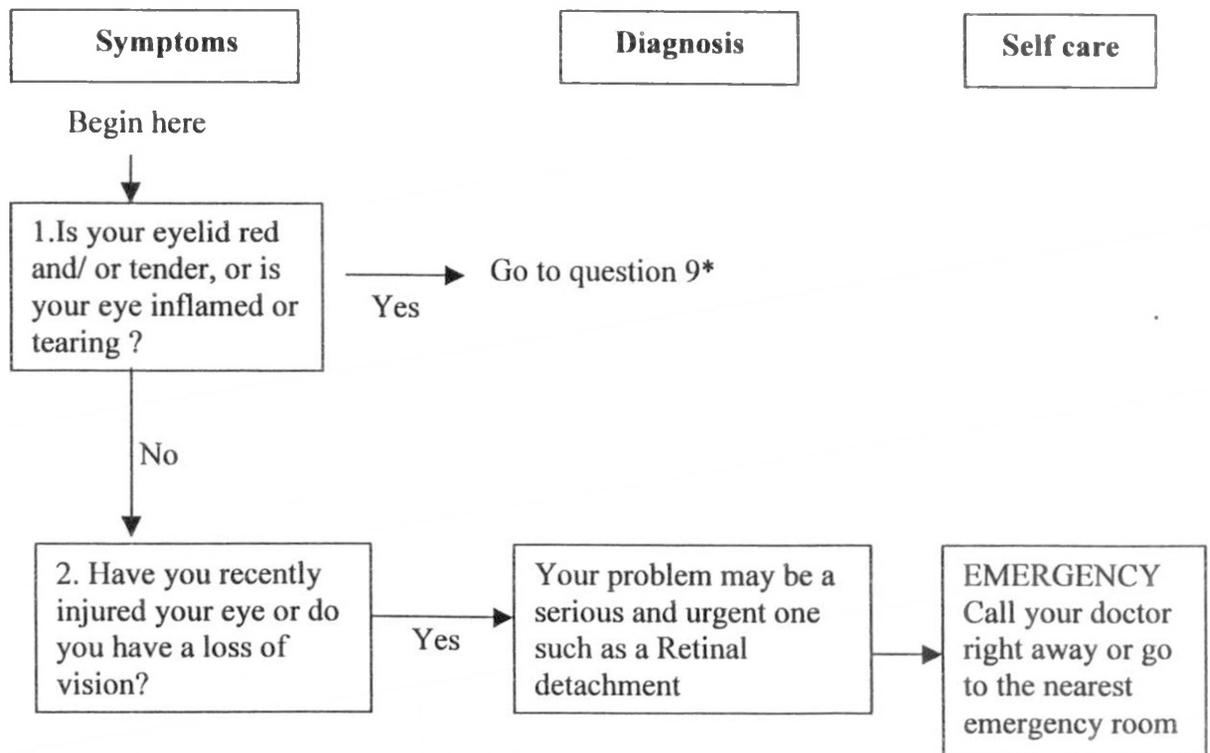
**Keratitis:** Keratitis is an inflammation of the cornea that may occur alone or simultaneously with conjunctivitis. The symptoms of keratitis include blurred vision, pain, and intolerance to light (photophobia).

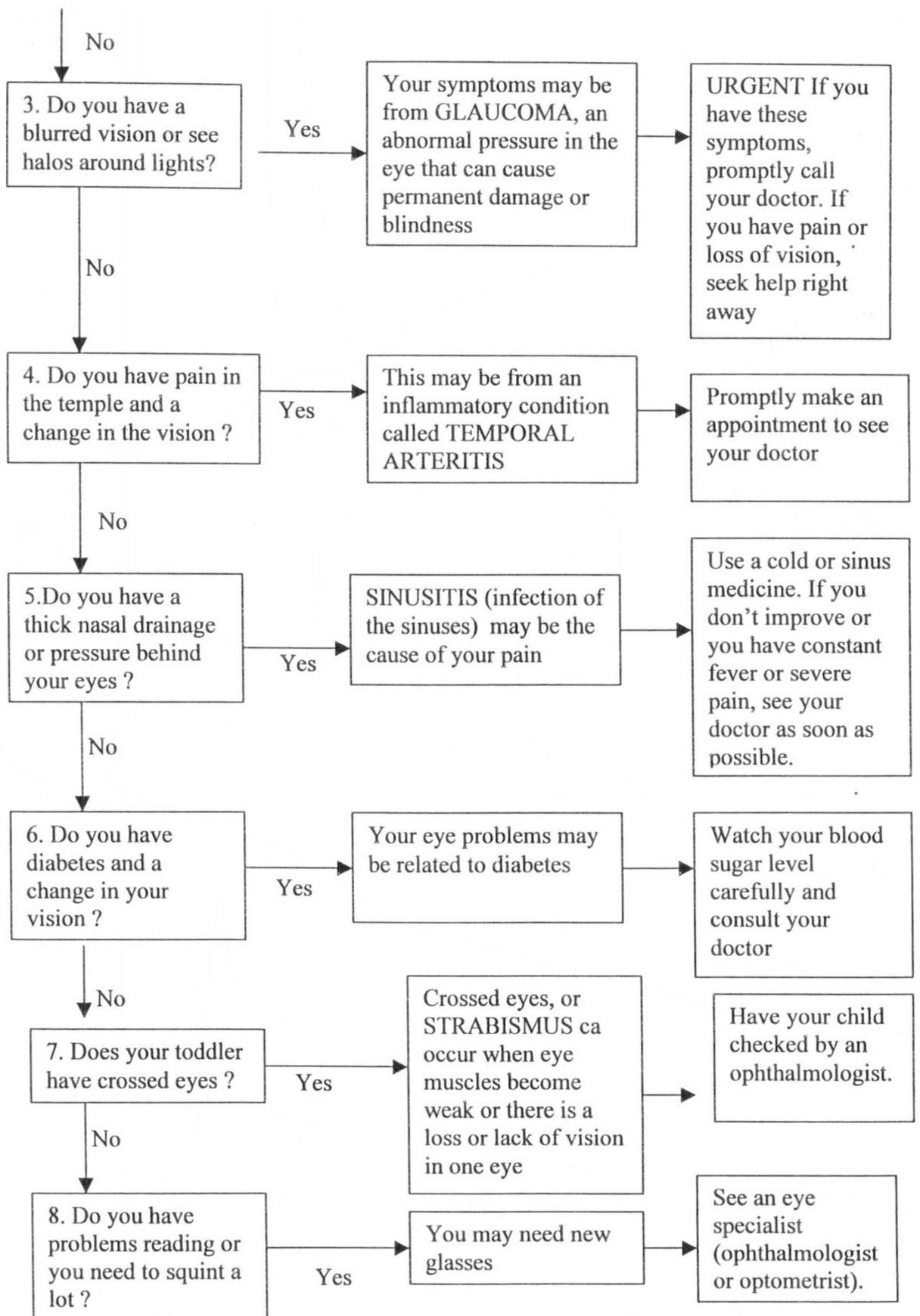
**Corneal swelling:** Corneal swelling, or edema is a condition in which fluid accumulates in the cornea. The edema causes visual disturbances such as halos or starbursts around lights. Reduced vision may or may not occur. Corneal swelling can arise as a complication of contact lenses, surgical damage to the cornea, or an inherited defect. Hyperosmotics are used to treat corneal swelling, but additional treatment by a physician may be necessary.

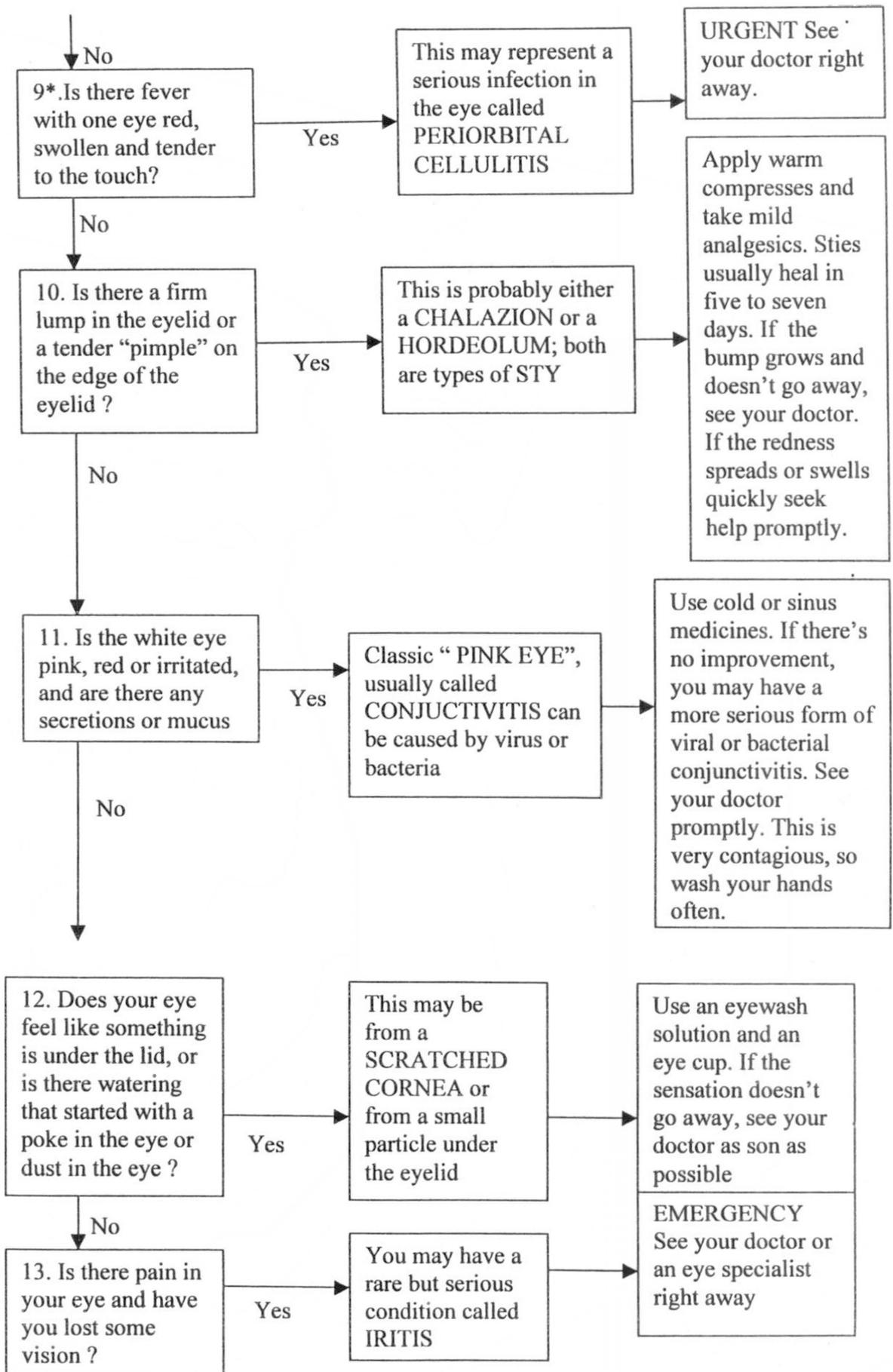
**Uveitis:** Uveitis is an inflammation of the eye structures in the uveal tract (the iris and other structures within the eye to which the iris attaches). Uveitis may occur without an obvious cause or may be due to trauma or an inflammatory disease in other parts of the body. Symptoms and signs of uveitis are similar to those of conjunctivitis and keratitis.

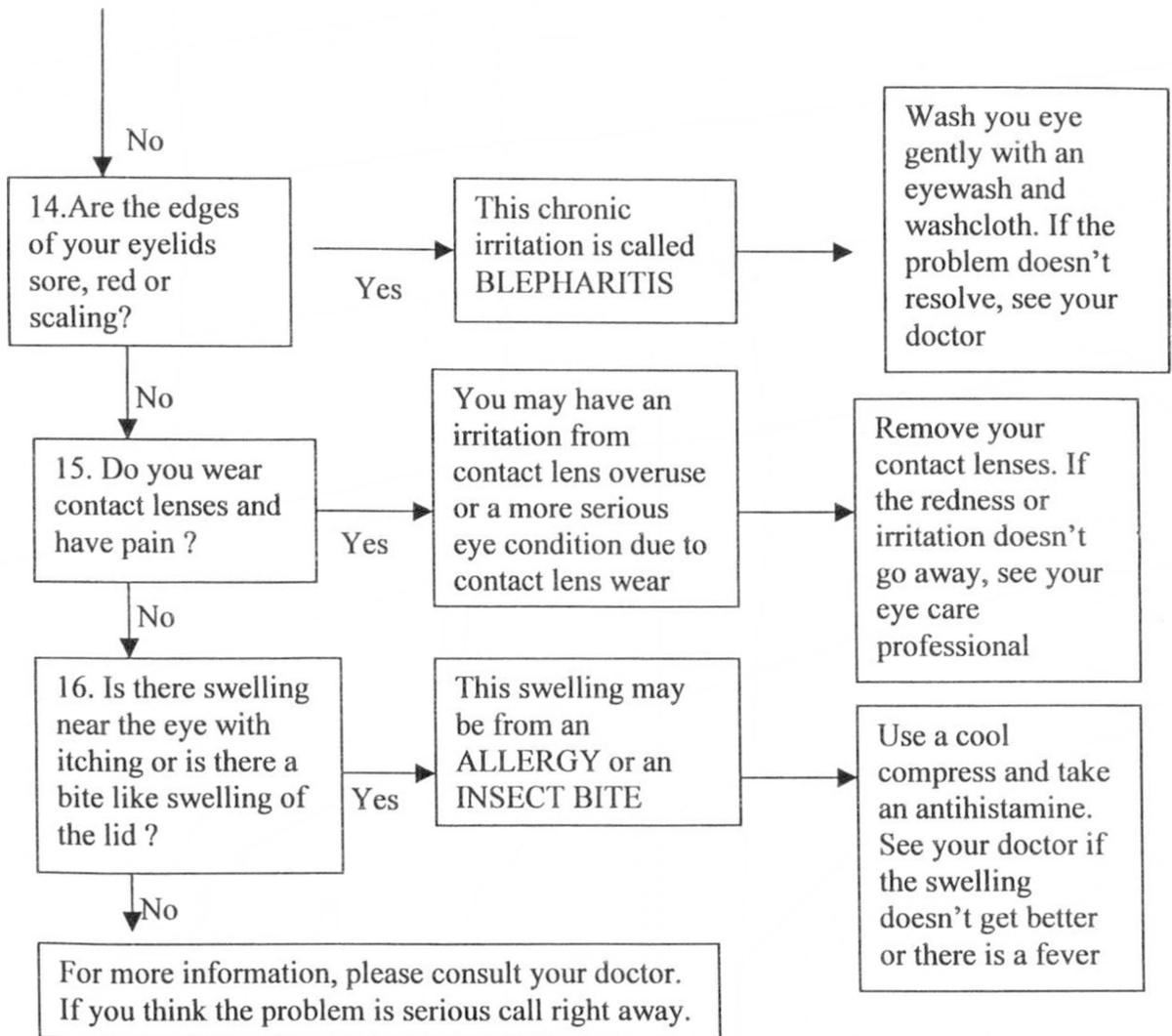
**Angle-Closure Glaucoma:** This disorder usually is triggered after an eye exam in which the pupils have been dilated. Angle-closure glaucoma is due to an obstruction of the canal system that drains fluid from the inside of the eye. As a result, fluid accumulates and the pressure within the eye increases. Patients may have a tendency to develop angle-closure glaucoma because of an anatomical defect in their eye. Common symptoms include an aching eyebrow or a headache that leads to nausea or vomiting. Angle-closure glaucoma should be suspected if symptoms develop after an agent is used to dilate the pupils for an eye exam.

Here is a summary of the symptoms diagnosis and self care as given in family.org









**Protect your eyes : Preserve sight. Eat foods rich in Vitamin A. Donate your eyes and give sight to the needy.**

## FUN WITH MATHEMATICS

**Viswanatha Rao,  
Bangalore.**

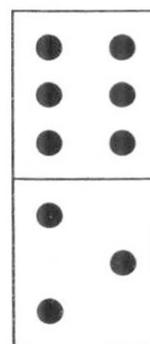
Mathematics is considered to be the 'Queen of all Sciences'. Yet children at school develop a phobia for mathematics because teachers do not create an interest in the subject by involving them in the classes. Currently, if you look at all the people who think mathematics is dull, it's because of their experience. When we teach mathematics, we are not sensitive to the audience. Teachers are performers in front of an audience. Some teachers don't realize they have to reach their audience. Mathematics is magic. Mathematics can be fun!. You may not realize it but there are significant mathematical ideas behind many thought provoking games with numbers, logic puzzles, magic squares or mathematical tricks. It is possible to make learning of mathematics fun through simple illustrations and activities.

Thinking creatively requires a certain basic mindset. If you train your mind to think creatively, you can transport your mindset and find novel and interesting solutions to everything going on around you. If you say, "I'm just going to find patterns in the world around me," the act of searching for a pattern will enable us to look for structure as it emerges. Then all of a sudden the world view sharpens a bit. Not through solving for X, but through the mindset of mathematics.

The purpose of this session is to make you all develop interest in mathematics. Let us divide ourselves into groups and in each group we shall do an activity and explain it to others.

**Group1:** Here is a box of cards marked with dots. Ask one of your group members to choose a card without a blank from the box and do the following things.

1. Multiply one of the numbers by 5
2. Add 7 to the result
3. Multiply the sum by 2
4. Add some other number on his card
5. Tell you his answer



Knowing his answer, you can tell him the 2 numbers on his card.

Suppose he chooses the 6:3 card.

He multiplies one number by 5      Adds 7 to his result      multiplies the sum by 2

$$6 \times 5 = 30$$

$$30 + 7 = 37$$

$$37 \times 2 = 74$$

14. Are the edges of your eyelids sore, red or scaling?

Adds the other number on his card  
He tells you his answer

$$74 + 3 = 77$$

$$77$$

How will you find out the number on his card?. You subtract 15 from his answer. The result is a 2-figure number made up of two numbers on the card chosen at the start.

$$77 - 14 = 63$$

He chose the 6:3 card.

**Group 2:** Have you heard of the Four 4's puzzle ? You can write mathematical expressions with answers from 0 to 100 by using four 4's and any combination of mathematical operations. For example:

- $0 = (4+4) - (4+4)$
- $1 = (4+4) / (4+4)$
- $2 = (4 \times 4) / (4+4)$  and so on.

Try these combinations to obtain the other numbers lying between 3 and 100.

**Group 3:** You can check out some Trapeze formed by several mathematical equations :

**Trapeze 1 :**

$$\begin{aligned}1 \times 9 + 2 &= 11 \\12 \times 9 + 3 &= 111 \\123 \times 9 + 4 &= 1111 \\1234 \times 9 + 5 &= 11111 \\12345 \times 9 + 6 &= 111111 \\123456 \times 9 + 7 &= 1111111 \\1234567 \times 9 + 8 &= 11111111 \\12345678 \times 9 + 9 &= 111111111\end{aligned}$$

**Trapeze 2 :**

$$\begin{aligned}1 \times 8 + 1 &= 9 \\12 \times 8 + 2 &= 98 \\123 \times 8 + 3 &= 987 \\1234 \times 8 + 4 &= 9876 \\12345 \times 8 + 5 &= 98765 \\123456 \times 8 + 6 &= 987654 \\1234567 \times 8 + 7 &= 9876543 \\12345678 \times 8 + 8 &= 98765432 \\123456789 \times 8 + 9 &= 987654321\end{aligned}$$

**Trapeze 3 :**

$$\begin{aligned}9 \times 9 + 7 &= 88 \\98 \times 9 + 6 &= 888 \\987 \times 9 + 5 &= 8888 \\9876 \times 9 + 4 &= 88888\end{aligned}$$

$$98765 \times 9 + 3 = 888888$$

$$987654 \times 9 + 2 = 8888888$$

$$9876543 \times 9 + 1 = 88888888$$

$$98765432 \times 9 + 0 = 888888888$$

Now, you should check out some interesting equations... where you will find a nice symmetry :

$$1 \times 1 = 1$$

$$11 \times 11 = 121$$

$$111 \times 111 = 12321$$

$$1111 \times 1111 = 1234321$$

$$11111 \times 11111 = 123454321$$

$$111111 \times 111111 = 12345654321$$

$$1111111 \times 1111111 = 1234567654321$$

$$11111111 \times 11111111 = 123456787654321$$

$$111111111 \times 111111111 = 12345678987654321$$

**Group 4:** Try doing quick addition with the calendar. Choose a week of 7 days (it can be any week of any month as long as it has 7 days). Now add the numbers of that week. Don't tell me the answer. Just tell me the number of the first day of the week and I will find the sum too.

- Student's chose the week and added the numbers carefully and said they were ready.
- One of the students said he chose the week beginning April 8<sup>th</sup>.
- The teacher then said that the sum was 77.

That's right said the student and asked how he could add so fast. The teacher told the students that the answer was to add 3 to the first day of the week and multiply the sum by 7. He then asked the students to try with the other choices.

**Group 5: The number 8.**

An interesting number is 8. Make a complete table of 8's.

$$1 \times 8 = 8 \quad (0 + 8 = 8)$$

$$2 \times 8 = 16 \quad (1 + 6 = 7)$$

$$3 \times 8 = 24 \quad (2 + 4 = 6)$$

$$4 \times 8 = 32 \quad (3 + 2 = 5)$$

$$5 \times 8 = 40 \quad (4 + 0 = 4)$$

$$6 \times 8 = 48 \quad (4 + 8 = 12) \quad 1 + 2 = 3$$

$$7 \times 8 = 56 \quad (5 + 6 = 11) \quad 1 + 1 = 2$$

$$8 \times 8 = 64 \quad (6 + 4 = 10) \quad 1 + 0 = 1$$

What do you notice about the sum of the figures of each product? ( Look in the brackets) Do they decrease in the order 8, 7, 6, 5, 4, 3, 2, 1? Is this true of larger numbers? Try multiplying 8 by 19, 20, 21, 22, 23, 24, 25, 26. Does it work .

### Group 6: The number 6.

Some numbers surprise us by acting in strange and interesting ways. The number 6 is one of these. Look at the table.

$6 \times 2 = 12$	$1 + 2 = 3$	}	
$6 \times 3 = 18$	$1 + 8 = 9$		
$6 \times 4 = 24$	$2 + 4 = 6$	}	
$6 \times 5 = 30$	$3 + 0 = 3$		
$6 \times 6 = 36$	$3 + 6 = 9$	}	
$6 \times 7 = 42$	$4 + 2 = 6$		
$6 \times 8 = 48$	$4 + 8 = 12$	}	→ $1 + 2 = 3$
$6 \times 9 = 54$	$5 + 4 = 9$		

No matter how far you go, the sum of the figures in the products will always be 3, 9, 6, in that order. Try this on larger numbers:

$6 \times 36 = 216$	$2 + 1 + 6 = 9$	
$6 \times 37 = 222$	$2 + 2 + 2 = 6$	
$6 \times 38 = 228$	$2 + 2 + 8 = 12$	→ $1 + 2 = 3$

### Group 7: Squaring a 2 or 3 digit number ending in 5

To find the square of a number ( 2 or 3 digit ) that ends in 5, just use this trick:

- Remember that any number ending in 5 when squared always ends in 25.
- Look at the digits before 5 and multiply it (them) by the next higher number and put them in front of 25.
  - Eg: 35 squared is 3 times 4 ( one higher than 3) or 12 and put that in front of 25. The number is 1225.
  - 55 squared is 6 times 5 ( one higher than 5) or 30 and put that in front of 25. The number is 3025.

### Group 8: Magic Squares.

The study of numbers is quite ancient. Centuries before the time of Christ the mystical use of magic squares appeared in China and India. They were engraved in stone and worn as necklaces to bring good fortune or ward off evil spirits. A magic square takes a sequence of numbers and arranges them so that the numbers in each row, column and sometimes each diagonal will add to the same total. Here is an example of a 3 x 3 square.

Try solving many more such puzzles and tricks and enjoy learning mathematics

2	9	4
7	5	3
6	1	8

## ADULTERATION OF FOOD A SOCIAL EVIL

Dr Saraswathi,  
Professor,  
Dept. of Post graduate Studies and  
Research in Food & Nutrition,  
Manasagangotri, Mysore.

Don't you get attracted by the delectable and the attractive color of the sweetmeats or "Mithai"? You believe that they are decorated with an equally attractive silver foil or so! "Besan ladoos", the color is so attractive, that you almost want to devour it. Do you love the whiteness of the puffed rice rather than the puffed rice itself? Or the taste of that spicy deep yellow colored "Pakoda"? And you wonder why whenever you mom makes it at home you never get the same yellow colour or the crispiness.

When you move about in the market and see the attractively decorated sweets and other edible items your greed to have them becomes irresistible. And that's what it is meant to do to you. Attract you to buy and eat. But beware!. In the process you may be eating... Metanil yellow a non-permitted coal tar dye commonly known as 'Kishori Rang', Rhodamin-B, Lead Chromate or perhaps Ultra Marine Blue. These are all non-permissible and banned colors and they cause serious health hazards and may also cause cancer in the long run. They are carcinogenic. Now what exactly is food adulteration?

### Food adulteration

Food adulteration is the act of intentionally debasing the quality of food offered for sale either by the admixture or substitution of inferior substances or by the removal of some valuable ingredient. Food is declared adulterated if:

- a substance is added which depreciates or injuriously affects it
- cheaper or inferior substances are substituted wholly or in part
- any valuable or necessary constituent has been wholly or in part abstracted
- it is an imitation
- it is coloured or otherwise treated, to improve its appearance or if it contains any added substance injurious to health

### Food... the basic necessity of life.

We toil day and night for what? For that two morsel of wholesome nutritive food. And if at the end of the day we are not sure of what we eat, than what are we toiling for? We may be eating a dangerous dye, sawdust, soap stone, industrial starch, Aluminum foil and believe it, even horse-dung! inviting disease rather than good health. And what are the law enforcing authorities doing? Looking the other way, ignoring, sitting on files and being bought and bribed.

Milk... that ever-enduring milk. From times immemorial it has been the basic staple food right from our growing up stage, to when we have grown up. As a child we need it for growth and as a grown up we need it for replenishing our nutrition daily. Tired

and bogged down, when you need something to rejuvenate... take a glass of milk. But even this has not been spared.

Common adulterants in milk are, water, flour, or any other starchy material say industrial starch. Addition of water and extraction of fat is very common and not harmful. But what when the milk you drink is not milk at all ?. Rather it is a combination of urea, liquid detergent, a little sugar, vegetable oil and water... a Synthetic Milk!. I would like to remind you of the case in Delhi, where a racket was busted a few years back and there was a lot of hue and cry in the media about the same. Think of all those children who may have had the synthetic milk, what havoc it must have created for their system physically. Even now are we sure that, we are not being supplied the same milk? Are the authorities randomly checking the milk at regular intervals ?.

Turmeric or *Haldi* is the basic ingredient of all our cooking. No dish is complete without it. But before you buy your next quota of this "masala" be careful of what you are buying. It may be adulterated with, Lead chromate, (which adds color as well as weight to it, being heavier), Metanil Yellow dye or any starch based items like flour or rice powder or even industrial starch. Except flour or rice powder, all the other adulterants are health hazardous and cause irreparable damage to our system when eaten at regular intervals for a long period of time. Take for instance Lead chromate. It is one of the most toxic salts of lead. It can cause anemia, paralysis, mental retardation and brain damage in children and abortion in pregnant women. Metanil yellow dye which is another non-permissible toxic colorant, is used mostly to color *Besan* or gram flour, pulses, miscellaneous readymade foods like *ladoo*, *burfi*, *jelabi*, *dalmoth*, *papad*, etc. to give them that attractive deep yellow color. Food grade colors are available in the market but being more costly, traders take advantage of the indifferent approach of the law enforcing authorities and substitute it with the said cheap and non-permissible dyes and colors.

Do you know what are the common adulterants in "*Masalas*" or spices?. Take for instance, coriander powder or chili powder the common adulterants are sawdust, rice bran and sand. But wait! One cannot even imagine or fathom adulterants like horse-dung and cow-dung! Being used. This is not only unethical, from the business point of view, but a sin committed against the society at large. Any trader who is found resorting to such means of adulterations should be taken to task very strongly. People should try as far as possible to buy whole spices and grind them at home or purchase properly packed spices (with proper informative labeling) of standard F.P.O. I.S.I or AGMARK certified companies.

Have you ever wondered why the puffed rice or any other white colored eatable looks so dazzling white and bright, and attractive on the show windows of a sweet shop? Well they may have been treated by ultra marine blue a chemical dye which is a non-permissible and prohibited. And for that rich deep pink color (*Gulaabi*) Rhodamin-B is used- again a non-permissible colorant. This colorant has also proven to be carcinogenic.

Argemone seeds that grow as weeds in the mustard fields are mixed with mustard seeds and its oil is mixed with mustard oil. When added in traces it is alright, but when added deliberately it causes serious health hazards and even death. Dropsy is a

straight after effect of the consumption of this oil. It may also cause swelling, irregular fever, low pulse rate, enlargement of the liver, respiratory distress which may lead to heart failure. Adulteration of oil has become rampant. With a wide variety of oils available in the market, the consumer is not sure what combination of oils he gets when he buys it loose from the market. It is very harmful and hazardous to health when mixed with crude castor oil, industrial palmolein-oil, mineral oils etc. This is certainly a crime against humanity aimed at earning money at the cost of public health.

*Ghee* is adulterated to the extent of 80 to 85 percent with *Vanaspati*. In actuality it is *Vanaspati* flavored with 15 or 20 percent of ghee by special process. Even way back in 1935-36 when, six samples of so called pure ghee was collected it was found that they were adulterated with vegetable products made from groundnut, and other oils and the extent of adulteration was 80%.

Sand, dirt, earth, gritty matter, soap stone, common salt are added to flour, refined flour (*maida*), gram flour (*besan*), spices, sugar, tea-dust and coffee. Washing soda is added to table salt. In tea-dust one can even find iron filings. The lovely silver leaves used to decorate sweets like *burfi*, and *pan*, you may be surprised to know what it is. It may be aluminum leaf or foil, which is again very bad for health, causing a lot of complications.

Dried seeds of volatile oil are added to cloves, while mineral acids to vinegar, papaya seeds to black pepper. Aniseed or '*sauf*' that after food tit-bit, is dyed with malachite green dye for that nice green color. In food grains and whole spices extraneous matter like stalks, stems and foreign seeds are added.

Castor oil a common adulterant in ground nut oil can cause abortion in cases of pregnant women when the amount of adulteration goes beyond 0.7 microgram per kg. of body weight. *Khesari Dal* which is often mixed in *Arhar Dal* can cause lower limb paralysis known as Lathyrism. Lathyrusativus species (*Khesari Dal*) has a toxic Amino acid known as Beta oxalyl amino alanine which is responsible for the above condition.

Food-preservatives have a very extensive use, which often constitutes adulteration. Salt is the classic preservative, but is seldom classified as an adulterant. Salicylic, benzoic, and boric acids, and their sodium salts, formaldehyde, ammonium fluoride, sulphurous acid and its salts are among the principal preservatives. Many of these appear to be harmless, but there is danger that the continued use of food preserved by these agents may be injurious. Some preservatives have been conclusively shown to be injurious when used for long periods.

Coal-tar colours are employed a great deal. Pickles and canned vegetables are sometimes coloured green with copper salts; butter is made more yellow by anatta; turmeric is used in mustard and some cereal preparations. Apples are the basis for many jellies, which are coloured so as to simulate finer ones. In confectionery, dangerous colours, such as chrome yellow, prussian blue, copper and arsenic compounds are employed. Yellow and orange-coloured sweets are to be suspected.

Artificial flavouring compounds are employed in the concoction of fruit syrups, especially those used for soda water. Butter is adulterated to an enormous extent with oleomargarine a product of beef fat.

To avoid illness, one is advised to select foods with care. All raw food should be considered to be contaminated, particularly in areas where hygiene and sanitation are inadequate. One is advised to avoid salads, uncooked vegetables, and unpasteurised milk and milk products such as cheese, and to eat only food that has been cooked and is still hot. Undercooked and raw meat, fish, and shellfish can carry various intestinal pathogens. Cooked food that has been allowed to stand for several hours at ambient temperature can provide a fertile medium for bacterial growth and should be thoroughly reheated before serving. Consumption of food and beverages obtained from street food vendors is associated with an increased risk of illness.

To protect himself the consumer should avoid buying loose edible items from the markets, and go for tinned or packed items on which proper informative labels are displayed, which includes the date of manufacture and expiry as well. They should stress on obtaining products with F.P.O., I.S.I. or AGMARK certifications. These are the most commonly used certifications and at least gives the consumers third party guarantee of the product. The middle-class or the upper class can protect themselves by the above methods. But what about the lower strata of the society: the laborers, the poor class who cannot afford to buy expensive packed items, who have to purchase only in small loose quantities daily due to economic constraints. What about them? How can they be protected? They are the ones who are taken advantage off, the maximum?. If we go to the interior parts and the rural areas of India and check for ourselves, the food articles that they are supplied with, are of the lowest and bottom most grade. Adulteration is so rampant and even the animals belonging to the highly elite class would refuse to eat it.

We do have the standards for food articles under Prevention of Food Adulteration Act.1954. But what are the concerned law enforcing authorities or the said departments doing. Are they doing anything at all?. 'Need' a social organization collected random samples from the market to get them tested and obtained the results in 40 days from the Pasteur Institute Shillong. Forty days! Just for a few simple tests? The maximum time required for each test is five to ten minutes which you 6<sup>th</sup> and 7<sup>th</sup> grade science students can perform. So the society made their own arrangements for testing the samples. What they found was very alarming. All the test results were positive. *Besan ladoos* had Metanil yellow dye. *Ghee* was adulterated with *Vanaspati*, *Chhena* (cottage cheese) had starchy material added to it. A few years back there was a big scandal about mustard oil at the national level in our country ?. Almost all the loose samples collected had strong traces of argemone oil.

Only when mass death occurs do our authorities react and swing into action and start haphazardly banning items and articles and cause inconveniences to the public. It was very difficult to get mustard oil when it was banned for a few days during the scandal. But what about this slow poison we are consuming daily when the amount adulterated is not enough to kill us instantly, but slowly in the long process and over a long period of time ?. The consumer must be protected against any health hazards as well as fraud and adulterations. How can this be done?. He should be made capable of knowing the composition and the nutritive value of food he is buying through informative labeling

And this can happen only when the concerned law enforcing departments are more vigilant and are really concerned for public health. But all the legislation cannot fully solve the problem of food contamination and adulterations unless the consumer himself becomes conscious of the hazards to health on such consumption and the law which are protecting him under such circumstances. Consumers must be taught the provisions of the Food Laws and Regulations and how they are protected under the said Law. What is required is that people are made aware of their rights to demand pure and nutritive food . Consumer movements should be started to put an end to this menace, instead of bearing the brunt and suffering quietly. Unscrupulous traders or manufacturers must be taken to task by way of filing of PIL (Public Interest Litigation) in the courts or dragging them to consumer courts, to eradicate and uproot such serious social evils of food adulterations which has assumed deep roots in our society. If not for good, it can at least be abated to a certain extent. Or else our future generations are certainly going to pay the price for our careless, negligent and easygoing approach to the whole issue.

# ASTRONOMY

**Kunigal Ramaswamy,  
Lecturer,  
Government Junior College,  
Kunigal.**

The Science of Astronomy has interested man from times immemorial. Watching the night sky one starts pondering over a number of questions like How day and night are caused? Why does one part of the world experience day while in the other part it is night? How are seasons caused? How are eclipses caused? What is retrograde motion of planets? and What is a celestial sphere? It becomes easy to learn astronomy through models for, trying to stretch your imagination or read from books though interesting, is a big deal. While I demonstrate the models I will answer some of the questions raised through the models you are going to see today.

## **Day and night and Seasons**

Day and night are caused by Earth's spinning motion. The "day" side of Earth faces the sun, and the "night" side faces away from the sun. As Earth spins, part of it moves from the night side to the day side. People see the sun rise in the east. At the same time, part of it moves from the day side to the night side. People see the sun set in the west.

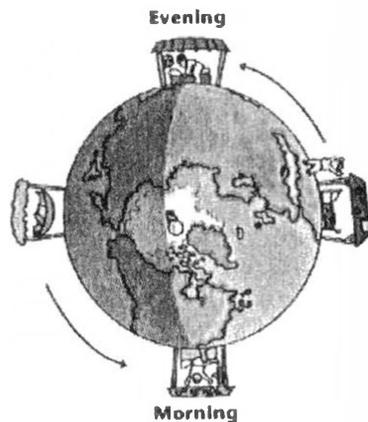
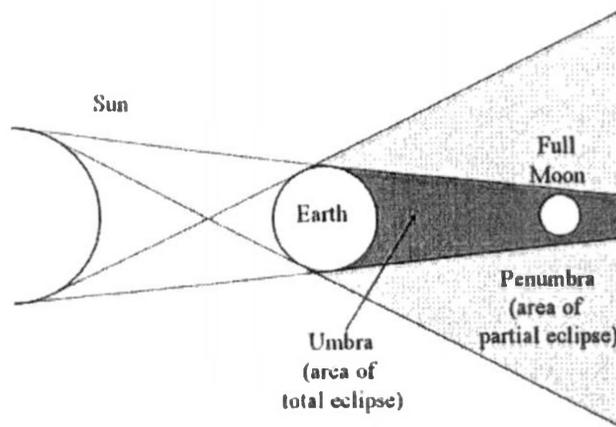


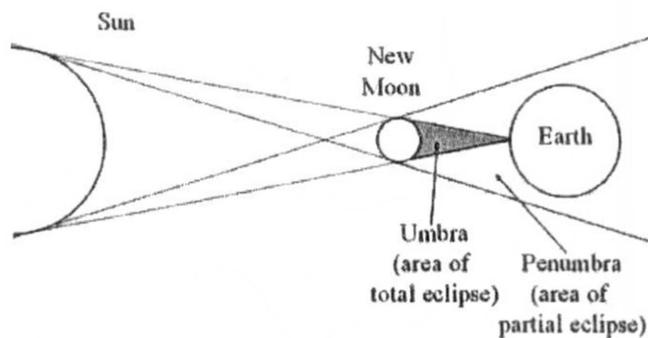
Image above: Earth makes one complete turn each day. When it is morning for you, your part of the world is turning out of the darkness into the light. When it is evening where you live, your part of the world is turning from the light and moving into darkness. Then it will be night.

## **Eclipses**

Eclipse means "gets dark." A **lunar eclipse** occurs when the Earth blocks out the Moon's sunlight. The moon "gets dark" as it goes into the Earth's shadow. Lunar eclipses happen during a Full Moon.



A **solar eclipse** is when sun "gets dark" because the moon blocks sunlight from reaching the Earth. Solar Eclipses happen during a New Moon.



Eclipses do not occur every time there is a full or new moon because the moon's orbit around the Earth is inclined.

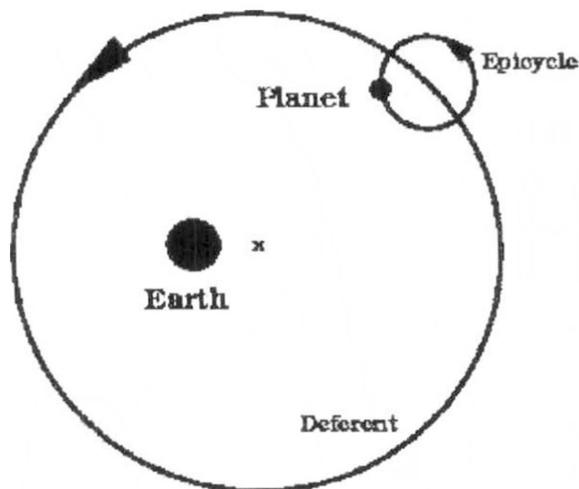
### The retrograde motion of planets.

Looking at the sky, night after night, man no doubt noticed very early that most of the brilliant dots he could see there retained their relative position. A triangle in that corner looked pretty much the same next night, and the night after that; and the same could be said of most of the figures he saw. But there were a few dots that moved against the fixed background of stars. These no doubt provoked great curiosity, and were the subject of very careful scrutiny. The ancient Greeks dubbed them *wanderers* for their relative rambling behavior, and it is from this Greek term that their modern name comes: *Planets*.

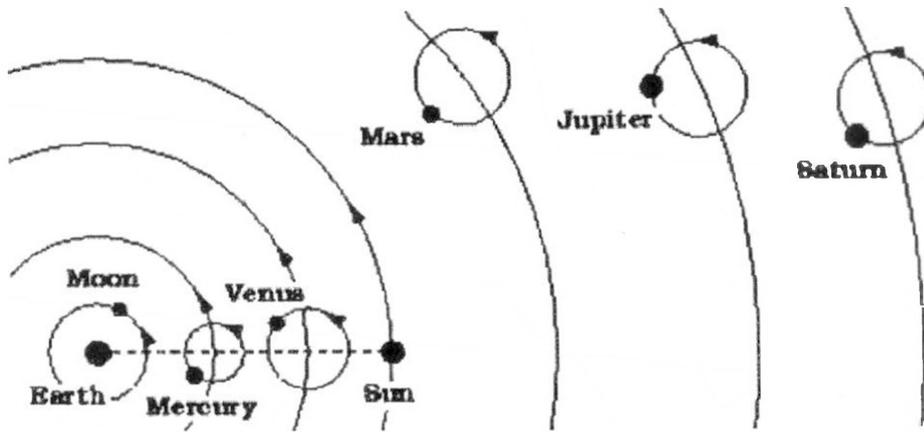
The simplest model to explain the motion of the planets has them, along with the Moon and the Sun (the other two wandering objects in the sky), moving in circles, centered around a fixed Earth. This model explains why these celestial objects move against the background of the stars, but there were some oddities in their movements that were not well explained by it.

One of the most notable of these behaviors has to be the *retrograde motion* of the planets. Planets, as we noted, move relative to the stars, and they do so, generally, moving from west to east in the sky. If we look at the sky, at the same time of the night on two different nights, we will generally notice that the planets have moved a little to the east. But every once in a while, a planet will do something funny: it will slow down its motion, will appear to "stop" for a short while, and will then start moving in the opposite direction, to the west. Eventually, it will stop again, and resume its movement towards the east.

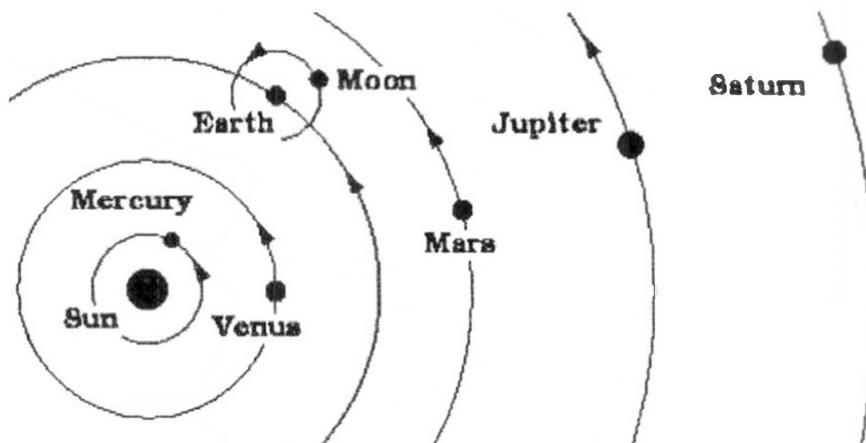
It was unacceptable that a planet would stop in its track and reverse its motion along its circular paths for a short while, to reverse them once again a while later. So, clearly, a better model was needed. Ptolemy devised the most sophisticated of these models that still kept the Earth as the center (so called *geocentric* models, although to account for other, subtler, irregularities, in his model the Earth was no longer at the exact center). One of its basic ideas was that planets were carried on a small circle called the *epicycle*, whose center moves along another, larger, circle around the Earth, called the *deferent*.



This model worked well as far as retrograde motion was concerned, since when the planet is in the lower part of the epicycle it is moving in the opposite direction as viewed from the earth. But, as mentioned above, there were subtler oddities that needed to be taken into account, too, and Ptolemy was forced to introduce more and more complications into his model to attempt to explain them. The model grew rather complicated and cumbersome to use, but still reproduced the actual motions well enough that it remained in use for over 1400 years.

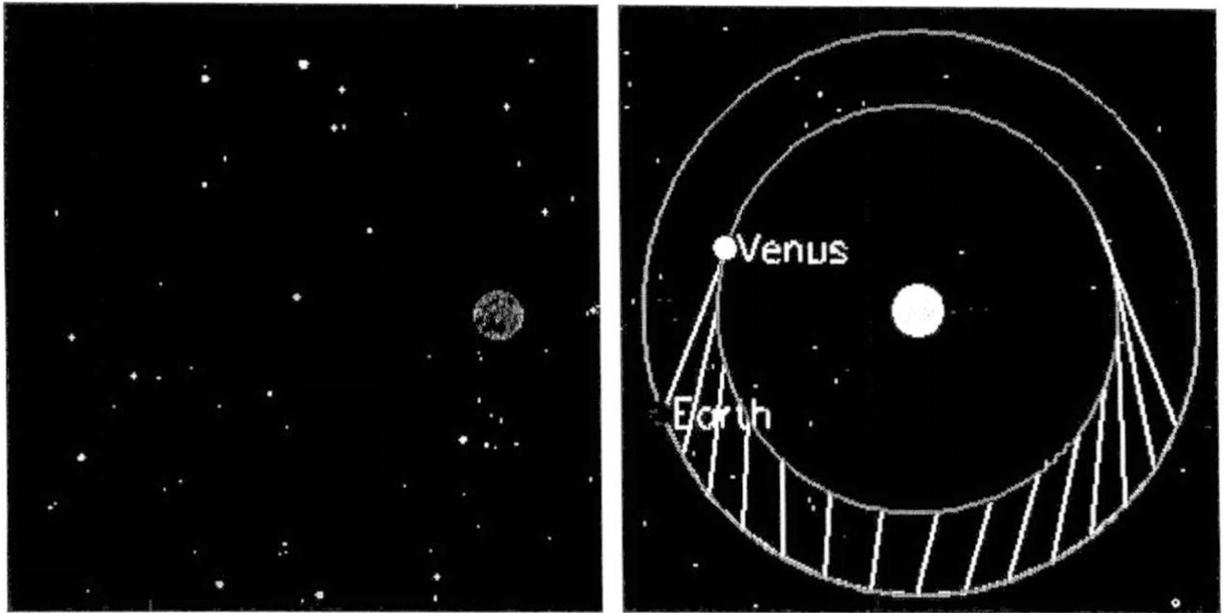


Around the year 1540, Copernicus offered a different kind of model, a *heliocentric* one, where the center was occupied no longer by the Earth, but by the Sun.



In Copernicus' model, planets still moved in circles, so he still needed to use some epicycles; but these, now, were only to explain the subtler irregularities. Retrograde motions arise from the combined motions of the planets and the Earth. Copernicus reasoned that planets further away from the sun would move more slowly than closer ones. As a faster planet overtakes the Earth in their rotations, its motion against the stars, as seen from the Earth, reverses.

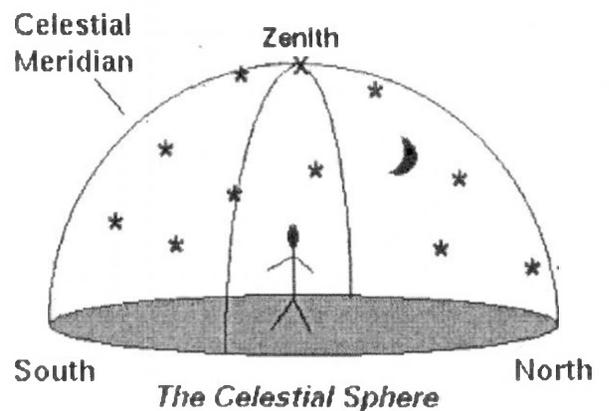
Look, for example, at the next figure:



As we view the moving Venus from the more slowly moving Earth, the line of sight (i.e., where in the sky, relative to the stars, we will see Venus) reverses its motion: it is first rotating counterclockwise, then (near the fourth and fifth position) starts rotating clockwise. This corresponds to the first reversal of apparent motion. A while later (around the ninth position) it starts rotating again in a counterclockwise direction, resulting in the second reversal. The same explanation works for the outer planets, too, only now it is the Earth that overtakes the other planet.

### The Celestial Sphere

It is useful in discussing objects in the sky to imagine them to be attached to a sphere surrounding the earth. This fictitious construction is called the *celestial sphere*. At any one time we see no more than half of this sphere, but we will refer loosely to the imaginary half-sphere over our heads as just the celestial sphere (see adjacent figure). The point on the celestial sphere that is directly over our heads at a given time is termed the *zenith*. The imaginary circle passing through the North and South points on our horizon and through the zenith is termed the *celestial meridian*. We will introduce additional terminology associated with the celestial sphere later.



### Motion in the Sky

It is clear after only minimal observation that objects change their position in the sky over a period of time. This motion is conveniently separated into two parts:

1. The entire sky appears to turn around imaginary points in the northern and southern sky once in 24 hours. This is termed the daily or *diurnal motion* of the celestial sphere, and is in reality a consequence of the daily rotation of the earth on its axis. The diurnal motion affects all objects in the sky and does not change their *relative* positions: the diurnal motion causes the sky to rotate as a whole once every 24 hours.
2. Superposed on the overall diurnal motion of the sky is "intrinsic" motion that causes certain objects on the celestial sphere to change their positions with respect to the other objects on the celestial sphere. These are the "wanderers" of the ancient astronomers: the planets, the Sun, and the Moon.

Actually, all objects are slowly changing their relative positions on the celestial sphere, but for most the motion is so slow that it cannot be detected over time spans comparable to a human lifetime; only the "wanderers" have sufficiently fast motion for this change to be easily visible.

# WHAT MAKES PAPER AIRPLANES FLY ?

Mr.A.V.Sastry,  
Kolar

## **Aerodynamics**

What makes a paper airplane fly? Air — the stuff that's all around you. Hold your hand in front of you with your palm facing sideways so that your thumb is on top and your pinkie is facing the floor. Swing your hand back and forth. Do you feel the air? Now turn your palm so it is facing the ground and swing it back and forth again, like you're slicing it through the air. You can still feel the air, but your hand can move through it more smoothly than when your hand was turned up at a right angle. By turning your hand, you made it more “aerodynamic”. How easily an airplane moves through the air, or its “aerodynamics,” determines how well an airplane will fly.

## **Drag and Gravity**

Planes that push a lot of air, like your hand did when it was facing the side, are said to have a lot of "drag," or resistance, to moving through the air. If you want your plane to fly as far as possible, you want a plane with as little drag as possible. A second force that planes need to overcome is "gravity." You need to keep your plane's weight to a minimum to help fight pull against gravity's pull towards the ground

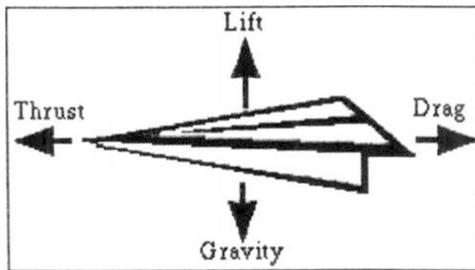
## **Thrust & Lift**

"Thrust" and "lift" are two other forces that help your plane make a long flight. Thrust is the forward movement of the plane. You give the airplane thrust when you throw it.

"Lift" comes when the air below the airplane wing is pushing up harder than the air above the wing is pushing down. This difference in pressure keeps the plane from dropping straight to the ground right away – it allows the plane to fly. Pressure can be reduced on a wing's surface by making the air move over it more quickly. The wings of a real airplane are curved so that the air moves more quickly over the top of the wing, resulting in an upward push or lift on the wing.

## **The Four Forces In Balance.**

Flight is possible when these four forces — drag, gravity, thrust, and lift — are balanced. Some things that fly (like darts) are meant to be thrown with a lot of force. Since darts don't have a lot of drag and lift, they depend on extra thrust to overcome gravity. Long distance fliers are often built with this same design. Planes that are built to spend a long time in the air usually have a lot of lift but little thrust. These planes fly a slow and gentle flight.



## Paper Airplanes

The most amazing thing about a paper airplane is that all you need to make one is a sheet of paper—nothing more. You don't need scissors, glue, tape, or paper clips. A few folds, a couple of adjustments, and you have a superb paper flyer. The properties of paper give the airplane all the attributes it needs.

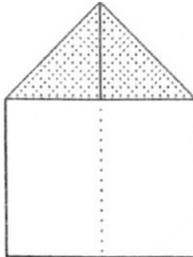
### How to fold a paper airplane

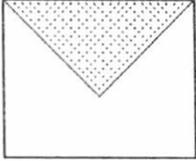
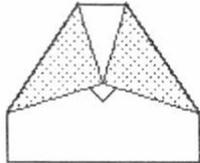
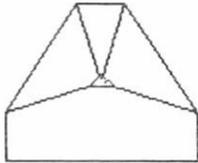
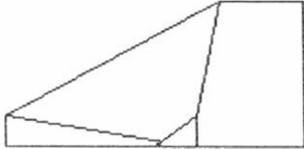
If you've ever made a paper airplane, you've probably just folded the paper into a simple dart—as people have done for at least a hundred years. But in the last two decades, paper airplane designers have imported techniques from origami.

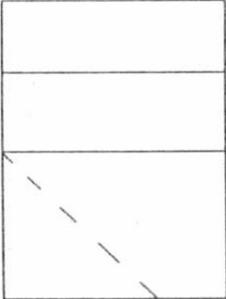
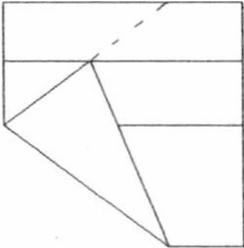
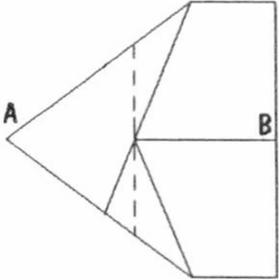
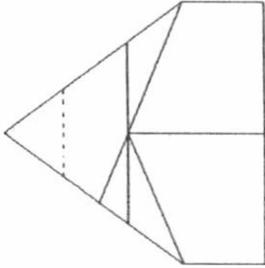
### Materials

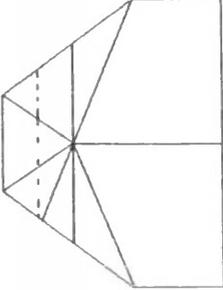
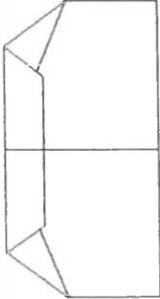
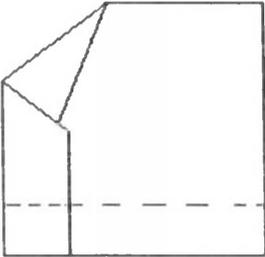
- One normal 8.5 X 11 inches piece of paper (printer paper)
- A ruler (if you want to be picky)

### Instructions

<ul style="list-style-type: none"> <li>• Fold a piece of paper in half lengthwise.</li> <li>• Open it back out again. The crease makes a centre line to work with.</li> </ul>	
<ul style="list-style-type: none"> <li>• Fold the top corners diagonally down and to the middle of the page.</li> <li>• The folded sections are triangle shaped and make a point at the middle.</li> </ul>	

<ul style="list-style-type: none"> <li>• Fold the pointed triangular part down over its bottom edge.</li> <li>• The flaps must be on the inside.</li> </ul>	
<ul style="list-style-type: none"> <li>• Take the top right hand corner and fold it down to the middle of the page at a point 15 mm above the point of the triangular part.</li> <li>• Do the same for the top left hand corner.</li> </ul>	
<ul style="list-style-type: none"> <li>• Take the tip of the triangular part that pokes out from under the flaps from the last step.</li> <li>• Fold the tip up and over the flaps so that they are held down.</li> </ul>	
<ul style="list-style-type: none"> <li>• Fold the page in half lengthwise.</li> <li>• The tip that you folded in the last step must be on the outside.</li> </ul>	
<ul style="list-style-type: none"> <li>• There are a few ways some people perform the final step: How to fold the wings. Take a wing and fold it down</li> <li>• Align it so that the front part of the wing (the longer edge) lines up with the bottom of the plane.</li> <li>• Do the same with the other wing</li> <li>• Open the wings out and push them up so that they tilt up slightly (as viewed from the nose).</li> <li>• Now you can show off to all your friends how far your plane flies</li> </ul>	<p>An accurate diagram cannot be given here</p>

<ul style="list-style-type: none"> <li>• Firstly fold the sheet in half along the line as shown and then open it out again marking the quarter line at the top as shown</li> </ul>	 <p>Fig1.</p>
<ul style="list-style-type: none"> <li>• Fold the bottom left hand corner to the top quarter line along the dotted line shown in Fig. 1 to give you Fig. 2 . Make sure the flap is folded from the center line to the top quarter line precisely otherwise the plane is unsymmetrical.</li> </ul>	 <p>Fig.2.</p>
<ul style="list-style-type: none"> <li>• Fold the top left hand corner to the top quarter line along the dotted line shown in Fig.2 to give you Fig.3.</li> </ul>	 <p>Fig.3.</p>
<ul style="list-style-type: none"> <li>• Fold the tip marked A to the point on the base marked B along the dotted line shown in Fig. 3 . Then open the plane out again leaving a firm crease.</li> </ul>	 <p>Fig.4</p>

<ul style="list-style-type: none"> <li>• Fold the left point to the crease made in Step 4 along the dotted line shown in Fig. 4</li> </ul>	 <p style="text-align: right;">Fig.5</p>
<ul style="list-style-type: none"> <li>• Fold the blunt left edge to the crease made in Step 4 along the dotted line shown in Fig. 5 and fold the whole thing over along the crease made in Step 4 to give Fig.6.</li> </ul>	 <p style="text-align: right;">Fig.6</p>
<ul style="list-style-type: none"> <li>• Fold along the center line marked on Fig. 6 to give Fig. 7.</li> </ul>	 <p style="text-align: right;">Fig.7</p>
<p>Fold wings down along dotted lines in Fig.7 to give the plane at the top of the page.</p>	

- Throw this paper airplane inside overarm as hard as you can almost level with the ground but perhaps (if anything) tilted slightly up towards the sky when you release the paper airplane.
- You could also throw it underarm as hard as you can in the air. If it catches a breeze outside then it will fly a long way if you do this. You could also throw it over arm outside.

### **Paper's Not Perfect , But.....**

The folds that make up an airplane give it the shape it needs, control the distribution of mass, and add stiffness where needed. By itself, a sheet of paper is not very stiff. Hold a sheet of paper by the edge and notice how it droops limply downward. Hold your multifold airplane at the rear center, however, and notice that it doesn't droop. Paper—because it has the ability to hold a fold—can be made rigid. A fold that increases the height of the body of the plane will make a plane that resists drooping under gravity. Small folds at the back edge of the wing or the body allow you to control the flight of the plane. Our plane has been designed so that you can make it fly best by bending up the rear edge of the wing a little bit.

Making a paper airplane—and looking at the properties that paper contains—can give you new respect for the lowly piece of paper, a thin, lightweight material that's impermeable to air. But the best thing about paper is that it is everywhere, ready to be recycled into airplanes with only a few quick folds.

## YOGA AND HEALTHY LIVING

V.Venkatachala,  
PGT, DMS, Mysore

Yoga is a traditional system of healing for the mind and body. It means union. It is a popular belief that yoga can cleanse our body of toxins and improve muscle tone, as well as help in blood circulation. Yoga first originated in India, and it still remains a living tradition and is followed as a means to enlightenment. This spiritual practice has been evolving for more than 5,000 years now. In yoga there are many spiritual and physical exercises that are practiced to improve ones health and well being. It is very beneficial for people suffering from anxiety, arthritis, headache, migraine, multiple sclerosis, osteoporosis, pregnancy, rheumatoid arthritis, and much more.

### **Healthy body and happiness:**

It is a popular saying that a sound mind could lead to a healthy body. Everybody has the right to be happy. Happiness and peace comes from within. It depends on your thinking and also on your body. Your body's health and your mind are directly related. Only if you have a healthy body will you be free from any physical pain, and your mind will not be disturbed. Without good health you cannot be completely at peace. In yoga various types of meditation are taught, and you are made to concentrate on your inner self. It helps to focus on positive thinking and push all the negative thoughts away. Every disease and sickness is considered nothing more than an imbalance in the natural harmony of the body and mind. Restoring this balance leads to true healing.

Yoga has become very popular worldwide. People are seeking for it, as they realize the importance of self-contentment and inner peace. Be it work pressure or health problems, yoga can help you see through it. Following yoga postures, breathing exercises and meditation can relieve you from all pains and troubles. Yoga can also help you to lose weight. It lets you tune in, chill out, and shape up, all at the same time.

### **Health benefits of Yoga:**

Yoga is said to be beneficial for healing many problems. Some of the benefits of yoga are:

- Helps to control anxiety
- Reduces stress
- Improves arthritis, back pain, and osteoporosis
- Relieves asthma
- Controls blood pressure, diabetes and epilepsy
- Combats chronic fatigue and depression
- Cures headaches, heart disease and multiple sclerosis
- Improves concentration and creativity

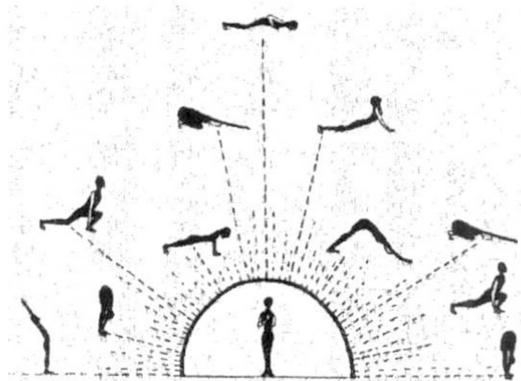
- Improves blood circulation
- Lowers fat
- Creates a sense of well being and calm

**Risks:**

It is very important to practice yoga under the supervision of an experienced and well-trained trainer; otherwise doing wrong exercises can sometimes worsen your problem and lead to complications. The best time to do yoga is said to be in the morning.

**Reach your goals:**

Yoga means to unify all forms of life. It has a holistic approach to all aspects of life - physical, mental and spiritual life. Each person is considered a unique combination of body, mind and soul. It teaches the importance of maintaining harmony between the mind and the body. One can achieve happiness, contentment, liberation and enlightenment from the union with the divine consciousness known as Brahman, or with Atman, the transcendent Self. With yoga, one can achieve these goals.



## NATURE WALK

**(Excerpts of the talk and Nature Walk organised by  
Mr.J.Srinivas of Natural History Museum, Mysore)**

“If a child is to keep alive his inborn sense of wonder without any such gift from the fairies, he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in” – Sense of Wonder.

The adult available to the child in the school to share his wonder is the teacher. Nature abounds in the variety of life forms, it offers us for our study to appease our curiosity. Organisation of nature walk by teachers helps draw upon the children’s natural curiosity of nature and introduces them to nature, exploration and wild life.

Few individuals walking through a nature area are aware of many things in full view, much less the features that require closer observation. Children if they are to become young naturalists should become more aware of their surroundings and strive to develop their powers of observation.

What should one do while taking a look at a tree? If the tree is viewed as a single object one misses the world of nature. A closer look should be taken – to really study the tree. What do we see then? Perhaps a closer observation reveals a bird nest on the high branch where the mother bird is feeding her young; or a song bird hopping from limb to limb, pausing to fill the air with his clear, melodious calls or a woodpecker busily searching for insects in the bark crevices. What is there on the underside of the lower branch? It may be a small tree lizard so nearly the colour of the wood that it seems to disappear when still. This protective camouflage helps conceal the lizard from both its prey and the hungry predators that seek it for food.

On looking again, a web carefully placed between those branches can be seen. In time an unwary insect will blunder into the trap to provide a meal for the waiting spider. However the insect may not get past the tree frog that is clinging to the side of the small limb in the tree. All trees are not alike nor do they house the same things. While looking closely one may see nothing or one may catch a glimpse of a squirrel scampering through the branches. As one gazes intensely at the leaves, the eyes of a creature curiously gazing back at us can be seen.

Becoming aware of the nature around our curiosity may be aroused and we may begin to wonder what kind of tree we are observing, which tree we are observing, which species of birds were seen nesting, hopping from limb to limb or gathering insects, which type of lizard was hiding in the tree, what kind of spider had placed her web between those branches, which tree frog that was and how it clung to the side of that limb so easily. Nature walks are hence useful and interesting.

## **A Nature Walk in the RIE Campus (as conducted by Mr.J.Srinivas)**

We shall go on a nature walk in the RIE campus. We shall start from the Technology Block, go round the social forest near the canteen, walk in the nursery near the DMS and come back to the Technology Block and go round the quadrangle. The following things you will need –

- a bag
- a towel
- a cap
- a bottle of water
- an empty match box
- a notebook and pencil
- things from nature
- imagination

### **Objective**

The objective of the nature walk is

- to help you identify plants/ animals/ insects
- to enable you to develop respect for environment,
- to develop the skill of observation

### **What should you do ?**

Divide yourselves into four groups each of which will be accompanied by a teacher. Go on the nature walk. While making your nature walk, you need not limit your observations to trees and the contents therein. The ground also has its story to tell. The passage of wild life through an area leaves signs for every one to see. Each animal has its distinct footprint and by learning to identify them you will be able to identify the animals that have walked where you are walking. (Some animals seen on the campus are cow, goat, dog, cat, rats, rabbit, etc). Resolve to watch an insect for 15 minutes to see where it is going and why. If the insects are not of a harmful variety, you can collect them in the match boxes you carry with you. While watching insects, a flying species would probably not be the best choice, but ants, beetles and caterpillars walk on the ground or tree trunks. These animals do not blunder around in the world randomly. Each one of them has a mission.

Observe each insect. Figure out its mission and learn to appreciate that every single species has a special place in the environment.

If you see a spider watch how it builds its web. Spiders prepare webs for storing insects as food. Web-making is an intricate art, which can hold your attention and it would be advisable to watch a web in progress if you come across one. Any one looking for spiders building webs will surely find something of ecological interest, if not a spider. Learning to develop an appreciation of nature is something that lasts a lifetime. Also observe slimy slugs, smell tree bark, look under rocks, feel crinkly and soft leaves while looking for insects. Make notes of any details you come across

about insects or plants/ birds/ leaves that you see but concentrate mainly on insects. Report back to the class and discuss between yourselves. Present your observations for a consolidation.

### **General Guidelines**

- Do not disturb any form of wildlife you see on the way.
- Keep silence during the walks and listen to nature and to the guide teacher.
- Wear light coloured clothes as these will not frighten the animals you see on the way
- Wear canvas shoes.

### **Post “Nature Walk” Session**

Children who went on the nature walk brought back leaves of different shapes and sizes, insects like ants, spider, caterpillar, cockroach, beetles, praying mantis (grasshopper), butterfly, ladybird. They reported that they saw rabbits and the usual animals like squirrels, rats, cats and dogs on their way. The insects especially ants lived under the leaves, rocks and bark of trees. Ants always moved in a line. They observed the ants carrying grains into the holes (ant holes) they had made in the ground. Some of the insects they saw had wings. There were a number of butterflies in the garden. Lichens were found on the bark of trees. (Lichens – the name was given by the guide teacher). The hibiscus flowers were filled with white insects, which they came to know were aphids. Birds they met on their way were, the crow, the sparrow, parrot, pigeons, stork, hen, fowl. They watched the rats move into the burrows. Garden lizards were a common sight. While the students reported what they saw, Mr.Srinivas helped the children classify the leaves on the basis of their shapes and sizes and taught them how to identify the plants/ trees they belonged to. Some of the leaves that the children brought were those of eucalyptus, banana, mango, ferns, hibiscus, rose, blades of grass, banyan, neem, jasmine, zerbera, lily, etc.

Regarding insects he mentioned that there were a variety of insects which had all the colours of the rainbow. Many kinds of beetles are collectors prize because they have brilliant metallic colours. Many insects blend perfectly with their background. For example, most beetles that live in the ground are black or brown. Some moths have the colour of the bark of the trees.

Insects have an amazing variety of shapes and special structures. Some insects look like sticks, green leaves, dry leaves or snail shells. Others resemble dry reeds or bird droppings.

### **Why are insects so successful ?**

1. They can adapt to the harshest living conditions. Although most insects feed on plant life, many have adapted themselves to eating almost anything. Various kinds of insects eat fabrics, opium, mustard plaster, cork, tobacco, face powder, paste or pepper.

2. Insects are small in size and can live in places that are too small for other animals and where they can also find food and protection from enemies. Some insects live between thin walls of a leaf. Some develop within a small seed or within the eggs of other insects. Because insects are small, they need little food. Even a bread crumb is a banquet for an insect.
3. Most insects have wings which give them an advantage over most other kinds of animals. Flying makes it easier for insects to search for food to escape from enemies and to find mates. They have a skeleton on the outside of their body.
4. They are successful because of their powers of reproduction.
5. All insects form part of the great web of life that includes human beings and all other living things. Insects feed on plants and animals, but they also are food for plants and animals. Insects thus help keep in balance the total number of plants and animals on the earth. If all insects disappeared, the earth would be completely changed. Many plants would become extinct and people probably could not survive.

The nature walk you undertook must have been quite interesting and kindled the curiosity in you to observe nature. Do not stop here, keep your ears alert to the sounds you hear. Keep your eyes wide open and observe things carefully be it in the garden or the farm, inside your home or at the backyard, for Lo and behold! Nature has many things to fascinate you, arouse your curiosity and enable you to become a young naturalist.

#### **Hints to the teacher**

Any teacher who would like to organise a nature walk should first identify the place and visit it. Apart from this he should look for the amount of plant and animal diversity available in that place. He should himself make a list of things available for observation; identify the things children ought to carry with them, fix the date and make an announcement after obtaining necessary permission from the school authorities. If the nature walk is being conducted in a park or zoo then permission to visit these places must be obtained in advance.

Nature walk should be taken up by the science teachers at least once in the school year for the different classes. One has to have a personal experience to enjoy the benefits rather than read or hear about the same.

## SNAKES

Snake Shyam,  
Jayalakshmipuram,  
Mysore

Snake is an animal with a long body covered with scales. It has no legs and uses its belly when it moves on land. It has eyes which are not covered with eyelids but scales. Therefore the eyes of the snake are always open. Its vision is good only for a short distance and can easily see movements. It cannot differentiate colors. Snakes have a narrow forked tongue which it often flicks out. It has an organ at the top of the buccal cavity which is called as the Jacobson organ. The tongue brings odors to this organ when the tongue touches it and thus the snake detects the presence of its prey.

Snakes belong to the class of animals called reptiles. They maintain a fairly constant body temperature which ranges from 20<sup>0</sup> C to 35<sup>0</sup> C. This they do by basking in the sun when they are to raise their body temperature and lower it by moving into the shade.

Snakes live almost everywhere on the earth. They live in deserts, oceans, forests, streams and lakes. Mainly they are found on the ground but some of them live underground too. Some snakes live on the trees and some others spend most of their time in water. They cannot live in places where the ground is frozen throughout the year, in polar regions or on high mountain tops. They are also not found in islands for example the Maldives, New Zealand and Ireland.

There are about 2700 varieties of snakes. Major varieties dwell in the tropics. The largest snake is the Anaconda of South America and the python of Asia. They grow upto 9 metres in length. The smallest is the Braminy blind snake which grows only 15 centimetres long. Blind snakes can probably distinguish only light and dark, In India the worm snake is the smallest and the largest is the python.

Snakes are both venomous and non venomous. About 270 varieties of them possess venom that is harmful to human beings. About 25 kinds cause most of the deaths from snakebites. Some people dislike snakes and fear them because they are venomous and because of their appearance and strange ways of life. Snakes are worshipped in India, and also have been the subjects of many myths and superstitions like a snake drinks milk, it keeps its enmity for a period of 12 years and the like. But all these beliefs are false. Such fears arise due to a lack of knowledge about the animals. Many of the snakes are not harmful. In fact, they are helpful to mankind as they control the population of the rodents which are 3 times our population and destroy the food articles.

Snakes vary greatly in their body shape, scales and colour. The colours we see are due to special pigment cells in deep layers of the skin, but some colours are due to the way the light is reflected from the surface of the scales. Most snakes have a drab coloring which matches their surroundings. Snakes possess skull, vertebrae, ribs, lungs in some cases, liver, kidneys and the reproductive organs. In most snakes, the digestive system which includes the stomach and the intestines, is specially suited to handle bulky food. Snakes can digest the entire body of their prey, except the hair and feathers of

their prey. It requires as many as 72 hours to completely digest the bones. Snakes feed on birds, eggs, snakes and small animals.

The scaly skin of the snake has two layers. The inner layer contains cells that grow and divide. The cells die as they are pushed upward by the new cells. The outer skin is made up of the dead cells. From time to time the snake sheds its skin because it is worn out. Snakes shed their skin, a process called moulting. For a short time before moulting they become less active. Its eyes become clouded and then clear just before it moults. While shedding its skin it rubs its mouth against a rock or a branch of a tree. It then moves forward and the skin is shed. This process can be compared to the removal of our socks. After shedding its skin it becomes aggressive.

Snakes reproduce sexually. During breeding female snakes release an odor which helps it select the male to mate. Most snakes lay eggs. The females generally lay them in shallow holes, tree stumps, rotten logs or such similar places. The number of eggs a female lays varies greatly among the different species. In many species, the female lays 6 to 30 eggs at a time. Vipers lay around 75 eggs and Cobras around 18 –20 eggs. Large pythons lay about 50 eggs, but they occasionally produce more than 100. About a fifth of the species of snakes bear live young ones, example being the green wine viper and sand bower.

Many kinds of animals prey on snakes. They therefore have a wide variety of defense mechanisms. Some change their colour, some escape into holes or burrows, some make threatening noises, others produce threatening noises. The Cobra defends itself by offering a threatening posture that may frighten away its prey, some lie playing dead as many animals do not like dead snakes. Pythons coil themselves into a ball. If other defences fail they attack and bite their enemies.

Why do people die of snakebites. It is mostly due to dehydration and shock. Snakes are mostly shy but bite people if by accident they are trodden. Most snakebites occur on the foot or lower leg, with a few on the arm or hand.

Snakebites are to be treated depending on whether the snake is a poisonous one or a nonpoisonous one. A poisonous snakebite requires an urgent medical attention. In the case of non- poisonous snakebites the area can be washed thoroughly with water and soap. It is not advisable to do so in the case of poisonous snakebites, because the venom traces present in the area can help the doctor to identify the species and select the right antivenom to treat the patient.

In the case of a venomous snakebite the first advisable thing to do is to call the doctor urgently and in the absence of one in the nearby locality, the victim should be transported to the hospital straightaway. The victim must be kept as still and quiet as possible, since any movement will help the poison to spread throughout the body. The limb with the bite must be kept below the level of the heart so that the absorption of the venom by the body is delayed. A bitten leg should be rested on a pillow while an arm must be placed in a sling. The victim must be treated for shock.

Usually a swelling occurs in the area around the bite within a few minutes of the attack. However, if such a swelling is not seen then a little of the venom must have been injected into the body and the patient should recover quickly. The patient in such

case should be kept under observation for at least 12 hours. The person offering first aid should not cut or suck the wound as this may result in secondary infection or loss of blood. If the victim is not suffering from nausea, he may be given plenty of water to drink. Paracetamol may be given to reduce the pain but aspirin should not be given as this may stop the blood from clotting properly.

Snakes are important because they are a part of the environment and they help maintain the balance of nature. Snake venom has several uses in medicine and biological research. Antivenin, used to treat snakebites is prepared from the blood serum of horses injected with the venom. Neurotoxins in the venom are used for preparing certain pain killing drugs. The powerful enzymes present in the venom to breakdown complex proteins for biochemical studies.

In general snakes are abundant in most parts of the world. Human beings have caused a decline in some of the species either because of over hunting or for farms, building dwellings or industries. Snake skins are used to make belts and handbags. Several countries have laws to prevent the importation of such items so as not to endanger the species further. Snakes can be handled if one has respect for them and is not overconfident.

## BIRDS

**K.B.Sadanand,  
Jayalakshampuram,  
Mysore**

All like birds because they are colorful and sprightly creatures, fond of movement and are always active, talking to each other. Most of the birds have a wonderful repertoire of songs and calls. If one starts observing the birds all of them start appearing beautiful, even the parakeet. They are blessed in that they enjoy freedom which we all envy and would like to enjoy. There are many birds in our country. The ornithologists are those who study the birds and the field of study is called ornithology. India has produced the world famous ornithologist Dr Salim Ali. He traveled over the length and breadth of India and the subcontinent extending from Afghanistan to Burma and Tibet to Kanyakumari and Srilanka. He built up a wonderful team of young ornithologists then. According to them in India we have 1300 species of birds. If India has so many then what about the world. In the world we find 9000 species. Some species are not found in India. To name a few, they are the parakeet, nightingale and the penguin. We need to be familiar with the birds in our country. To reach our destination we depend on local transport, railways, airways and buy tickets. To go abroad we not only buy tickets and travel by air but we also need a passport and a visa, which the birds do not need. Of the 1300 species found in India about 300 birds come from countries like Siberia, Europe, China and Africa. They just come. In fact migration of birds is a fascinating phenomena. The birds come only at certain times of the year, mostly in winter. They migrate from the northern hemisphere to the southern hemisphere, the reason being the extreme cold weather, short daytime to search food and lack of fruits and insects. We are close to the tropic. Days are longer making it easier to find food. The birds are wonderful in that they live most of the time in the air. They are aerial creatures. They fly most of the time. Accordingly their bodies are streamlined. They are pointed at the beaks and the tail. Two of them are modified into wings which cover their body. Legs are modified according to their habitat. They are light because their bones are hollow. Air flows into these cavities making their body light. Their body metabolism is more because they are to fly. Their body temperature is around 40 °C to 42 °C. No machine can match it in its manouvering capability. A tiny bird as small as a sparrow can fly anywhere and can turn anywhere. The body morphology of birds is also wonderful. They have a mouth like a beak which is adapted to the type of food they take. Their feet are also different. If they have to walk they have pointed fingers and if they are to swim they have webbed feet. All these put together the bird morphology is well suited to the functions they perform. They have nostrils, tongue and eyes. Their eyesight is very sharp. Birds which we notice at a distance of 15ft from us would have already noticed us from a distance of about half a kilometre. Birds which can see only in the night as the owl have special type of eyes.

Why should we observe birds and worry about them?. They are important from several points of view, and even for economic reasons. They are not only good sources of food, but also indulge in dispersal of fruits and seeds and are good pollinating agents. When they congregate, their droppings can be used as fertilizers. Many of the birds live in clean water. For example the kingfisher does not live in muddy and unclean water. In Fact if no bird life is seen near water lakes then it is

indicative of the fact that the water is polluted. The best places to observe birds are lakes and water tanks. Birds can be identified by their sounds. What do we require for bird watching?

- Interest
- Dull clothing
- Keeping our eyes and ears open
- Maintenance of silence
- A book to note down the name of the bird sighted, time at which it was sighted, name of the place at which it was sighted, its color and size etc.

Such a 'field diary' helps us in the correct identification of birds.

## TOWARDS BECOMING A SCIENTIST

### A Process Approach

**C.G.Nagaraja,**  
**Principal,**  
**Mahabodhi School,**  
**Saraswathipuram,**  
**Mysore.**

A Scientist does his/her work very systematically. He tries to find out new ideas, new things, by searching it in nature and in the things around him. He tries to think, see, hear and do things to get more and more information. He goes step-by-step. This is known as **Scientific method**. You may try to learn the same in your laboratory of the school. You can try the same at home and outside the school also. By practicing some steps will help you learn the **Scientific Skills**. The following are the most important **Scientific Skills**.

- 01 OBSERVATION
- 02 COLLECTING INFORMATION
- 03 ASKING QUESTIONS (Raising doubts)
- 04 CLASSIFYING; COMPARING; SUGGESTING EXPLANATIONS
- 05 RECORDING INFORMATION
- 06 INTERPRETING INFORMATION
- 07 PREDICTING (ANSWERS) SOLUTIONS
- 08 CONDUCTING EXPERIMENTS
- 09 CONCLUDING
- 10 MAKING NEW THINGS
- 11 OBSERVING AGAIN AND AGAIN

So, you can also try to learn some of the skills a scientist uses to learn new ideas. TRY ONE at a time, then you can practice all at a time.

You should be able to learn the following, after completing the laboratory work for 10 days. Each day you will DO – activities, SEE – many things, HEAR – discussions, talks, EXPERIENCE – new ideas by thinking.

You are expected to learn the following:

- |                      |  |
|----------------------|--|
| 01 OBSERVATION       | - of natural phenomena, experiments                      |
| 02 COMMUNICATION     | - Talk, Write, Discuss                                   |
| 03 HANDLING SKILLS   | - Laboratory equipment simple tools.                     |
| 04 CREATIVE THINKING | - New ideas about things you see, do and hear.           |
| 05 CURIOSITY         | - about things around you.                               |
| 06 RAISE QUESTIONS   | - about what you see what you experienced what you read. |
| 07 BECOME AWARE      | - of natural processes, like cause and effect.           |

Each of the PROCESS SKILLS is handled independently. Children will get sufficient time and experience to learn the learning strategies and handling of the skill.

2 or 3 examples are provided for each skill. They will be guided through discussions and clues to learn 'how to learn'.

TRY –IT-YOUR-SELF at the end of each skill provide activities to practice the skill. Children are promoted at every stage to understand what they must learn.

Since there is nothing like a CORRECT answer to the problems posed for learning, children can think and discover without fear and anxiety. They are encouraged to collect as much information as possible on a given activity on a problem.

OBSERVING is not just seeing. Observation is studying something using our senses like touching, seeing, hearing, smelling, tasting (sometimes). By doing this, we can get many information about things, various happenings, nature and materials.

When you OBSERVE carefully you can see things that you had not seen before.

\* **PROCESS:** here refers to different types of mental activities the scientists experience during an investigation.

**Example A** Look at your pencil. You might have seen several times. Now OBSERVE THE PENCIL. Find out what you had not seen earlier.

1. It has colour. How many colours ?
2. It has lead. What is the colour of the lead ?
3. It is made up of wood. What is its shape ?
4. Does the wood have a smell. Explain.
5. How many sides are there in the wood ?

**Example B** OBSERVE A MATCH STICK USING A HAND LENS.

Put a match-stick on a white paper. Use a hand lens  
OBSERVE – Without a lens.

1. From what is it made up of ?
2. What is the red / black tip made of?
3. What is its shape ?
4. How many sides are there ?
5. OBSERVE – DISCUSS

## OBSERVING

### TRY IT YOURSELF

- Activity 1** A drop of ink in water – observation  
[\*Wait for instructions]
- Activity 2** Sugar crystals – Observation  
[\*Wait for instructions]
- Activity 3** Class room – Observations  
[ \* Wait for instructions ]
- Activity 4** A bean seedling – Observation  
[ \* Wait for instructions ]
- Activity 5** Burning of a Candle – Observation  
[ \* Wait for instructions]
- Activity 6** Photograph – Observation  
[ \* Wait for instructions]
- Activity 7**
1. Spend 30 minutes at home to OBSERVE Anything interesting.
  2. Report the same orally next day to your class.

### OBSERVING – COMPARING – Looking for similarities and differences.

When we compare things, we get information on the ways in which they are similar and different. You are using the skill of observation while comparing.

#### Example A Comparing Two – Pens

Blue and Red with Caps

Look at the pens carefully.

- a) How are these pens alike ?
- b) How are these pens different ?

#### **Alike**

Made up of plastic  
Ball points for writing  
Same shape  
Made in France  
Same length  
Metal Ball – points

#### **Different**

Colours are different  
One is fine, other is N.  
Writings are different.  
045 blue  
040 Red  
040 Red

Add more :        Shape  
                      Number of sides  
                      Smooth writing  
                      Smell  
                      Caps, etc.,  
                      Ink Colour.

Discussion on Observations:        Ask small questions when comparing.

### COMPARING

Example B :        Comparing half apple and half orange

#### Similar

Both are fruits.  
Half parts  
Both are eatables.  
Round in shape.  
Have skins  
Have smell

#### Different

Orange has segments  
Juicy  
Apple is soft but not segments.  
Different smell.  
Peel can be easily removed in orange.

Can you add many more ?

**DISCUSSION** on observations: Ask small questions when Comparing.

### TRY – IT – YOURSELF

#### Comparing

**Activity 1**        Comparing two leaves  
                      [ \* Wait for instructions ]

**Activity 2**        Comparing papers for writing  
                      [\*Wait for instructions] Blotter, Tissue, Typing, Photo-paper

**Activity 3**        Comparing Animals – Insect-Non-insect  
                      [\*Wait for instructions] Photographs – photocopied

**Activity 4**        Comparing seedlings  
                      [\*Wait for instructions].

Each of the activity to be discussed after completion.

### COLLECTING DATA

Collecting data means getting more information on a particular experiment, OR on a problem you are working OR on a living being. You do so by repeated observations.

**Example – 1** Repeat the experiment.

## Burning Candle Observation

Candle is made up wax.

It has a wick in the center.

When lighted it starts burning

The flame is yellow. Now concentrate on flame – (OBSERVE)

A hallow zone is in the flame

The yellow flame gives smoke at its top

Blue zone is also seen

A small part of the wick is burning

Hear and light are given out

Can you add some more in the space gives below.

## COLLECTING DATA

- Activity 1 :** Raisins in Vinegar  
[Wait for instructions]
- Activity 2 :** Copper Sulphate Crystals  
Before heating – after heating – adding water  
[Wait for instructions]
- Activity 3 :** Plastic comb and paper pieces  
[Wait for instructions]
- Activity 4 :** Keep an Onion for growth OBSERVE ONE WEEK  
[Wait for instructions]
- Activity 5 :** What information do these pictures give you.
- Activity 6 :** Read weather chart – collect information
- Activity 7 :** Collect information by studying the picture given to you. Food chain diagram Home Work.

## RECORDING

Scientists practice many ways of recording what they **do** and **observe**.

Most important ways of recording are (i) Listing (ii) Drawing (iii) Char tabulation (iv) Written description (v) Photographing.

You must try all the methods of recording. It depends on what you are doing and observing to select the ways of recording. Your **School dairy** is one recording device. You prepare photo albums, which records many important events. Stamp albums may be maintained. So, try some of the ways of recording.

### Example A : Listing

Keep a record of what you do on any schooling day. Especially very important days like School Sports Day. **Now Try it out** List all the things that you **Observed** (Saw, listened, activities etc.) on the sports Day of your School.

### Example B : Drawing How a plant looks like ?

Look at this plant. Make a **line-drawing** of all observations. Length of the plant. Number of leaves. Shape of leaves, Shape of roots etc.

## RECORDING

### Try – it – Yourself

#### Activity 1

Look at this picture. Imagine you have to describe to a blind person. So try to record your observations as Written description, so that you can explain [CHARTS, TABULAR FORMS, GRAPH – are given].  
[Call your teacher, if you need more instructions] Discuss.

#### Activity 2

Making Chart / Tabular forms for recording  
Chart / tabular forms recording helps to avoid descriptions, it makes things easy to remember. List the different Organs of your body and the functions they do. (Tabular form)  
Discuss.

#### Activity 3

Observing Nail – cutter – **Line – drawing:**  
A simple machine like nail-cutter. Has a design. Try to write the design by line-drawing.  
[your teacher will help you] discuss.

#### Activity 4

Recording important political events – photo collection on a piece of white paper write Day, date. Cut photographs from a newspaper. Stick them with data. List the information DISCUSS.

#### Activity 5

Line – drawings – biological materials.

Observe Cut – Sections provided to you.

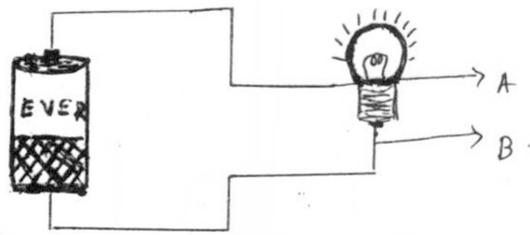
Record whatever you see as line – drawings.

- a) T S of Tomato      b) L S of Flower
- c) T S of Ladies Finger      d) L S of Capsicum and
- e) for home – work. DISCUSS.

### INTERPRETING

You have made an attempt to Record Information for your use. Now try to use it for other purposes. Interpreting means Reading with Care, to get information what you want. Tabular recordings, graphs Photographs, Written – descriptions can be read carefully. Always ask small questions about the information you are seeking.

**Example A :** Read the diagram.  
What is it telling ?



It tells that 2 wires are connected to dry cell and to a small bulb, one at (A) and another at (B). The bulb is lighted. It also means the bulb, the wire and cell are in good conditions.

#### Example B:

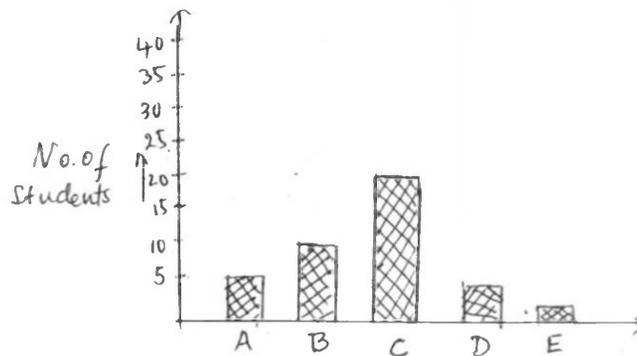
A = 5 kg

B = 10 kg

C = 20 kg

D = 30 kg

E = 40 kg



Look at the line drawings. Sometimes called bar-graph. It tells you many things. It tells there are 10 students with 10 kg weight. It also tells that 5 students, are there with the body weight being 40 kg. So on you can interpret the given information. Try to do so.

## INTERPRETING

### TRY – IT – YOURSELF

Activity 1 : Read the information given on SALE of carpets. Interpret about prices carpets compared.

	RED	GREEN	YELLOW
SHOP A	Rs.4,200/-	Rs.2,800/-	Rs.1,500/-
SHOP B	Rs.2,000/-	---	Rs.1,500/-
SHOP C	Rs.4,180/-	---	Rs.1,450/-
SHOP D	Rs.6,000/-	---	Rs.1,500/-

1. How many pieces of information is given in this table ?
2. Which colour is popular ?
3. Are prices reliable ?
4. Where do you want to buy and which one ?

Can you think of other information you can get..

Activity 2 : Read the information. List out as many interpretations as possible.

	DEC	FEB	APR	JULY
MYSORE	18°C	20°C	30°C	48°C
OOTY	5°C	20°C	40°C	50°C

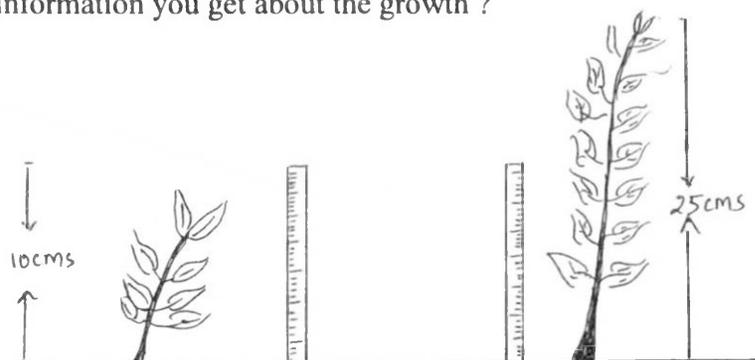
If tourists were to go, which month and which place will people select ?

What information can you get by this chart ?

Think of many other interpretations about the type of Clothing, sales, etc. during each month.

## INTERPRETING

Activity 3 : What information you get about the growth ?



As seen on 10<sup>th</sup> Dec 1990

As seen on 15<sup>th</sup> Dec 1990

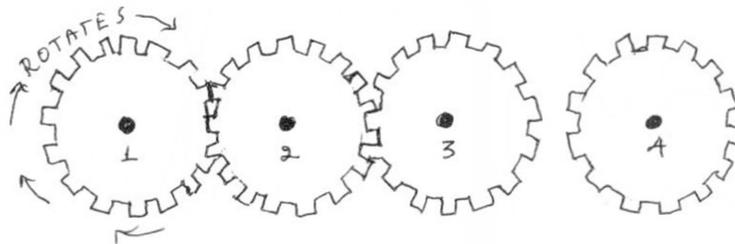
Do you find any difference after 5 days – in the height

Of plant  
In the height  
Of scale

Can you make list of information, that you may get from the pictures.

## DISCUSSION

Activity 4 : Interpret the diagram given

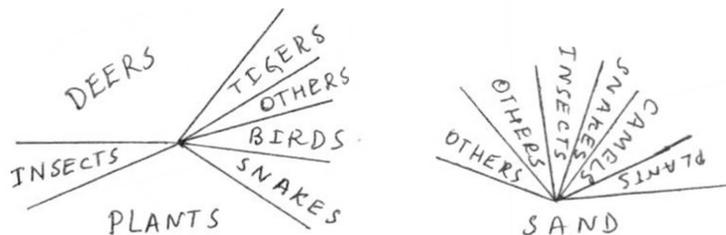


The arrows show the direction of rotation of wheel number 1. What will happen to wheels 2,3 and 4 ? Give your interpretation. List as much information as possible.

## CONCLUDING

Now you are in a position to find some thing new from the information given to you. When you discover some information after understanding the facts, Comparing, interpreting and analyzing. That will be your Conclusion.

Example A:



Forest

Desert

What **Conclusions** can you make on Types of animals by reading, data given in Chart A and B ?

Variety of animals in forest is more than in desert.

Which type of place is better for herbivores (plant-eating animals) ?  
Ask many questions, get an answer which is not given in the chart. **TRY**.  
Example : Why many plants grow in a forest, both not in a desert ?

**Activity 1 :** Concluding on Insects

You are given 4 sets of figures.

ALL Insect figure

NONE insect figure.

SOME Insect Some others

What conclusions can you give about the insect ?

(Clue – count the number of legs).

**Activity 2 :** Concluding plant growth.

You are given 3 figures (A, B, C)

Observe them.

What Conclusion can you draw about plant (C) ?

**Activity 3 :** Concluding on candle burning

Observe the experiments.

(A) → Candle burning in air.

(B) → Candle burning and a tumbler inverted.

Your conclusion : What is the most important thing required for burning ?

**Activity 4:** Conclusion on connections in a circuit – diagram.

Study the diagram given.

What conclusions can you draw ?

**HYPOTHESISATION** or (Suggesting explanations) or (Intelligent guessing)

You can explain how things work or why it does not work. Sometimes you can guess an answer; an explanation based on some data. It is called hypothesisation. Your guess may be right or wrong. It should be tested by doing experiment or by searching libraries.

**Example A :** Food cooks more easily and quickly in a pressure cooker than in a open vessel. Why ?

Explanation : The heat produced by steam does not escape. Pressure increases inside, temperature also increases in a closed cooker.

**Example B :** If 1000 seeds are put in a small pot for germination, then .....

Hypothesisation → then many seeds do not become plants.

Try to give as many explanations as possible.

**Example C :** A piece of bread kept in a cellphone bag for 5 days in a cup-board. Becomes bad. There will be black and white patches.  
Your hypothesis → Discuss with your teacher.

### Explanations / Hypotheses

### TRY – IT – YOURSELF :

#### Activity 1 Experiment – Oil in water

- Wait for instructions.
- You must give One hypothesis & explanation.

#### Activity 2 Experiment – Cold and Hot water

- Mixing using a separator
- Wait for instructions.

Give one possible guess – hypothesis.

Suggest Explanation for what you observe.

#### Activity 3 A farmer used fertilizer to the plants. He got good fruits about 1000.

Another farmer wanted 2000 fruits, so he used twice as much the Fertilizer as the other former used.

Guess – What happened?

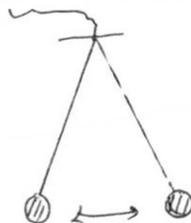
Can you think of explanations for your guess?

### PREDICTING

In Science, often we ask questions like, what will happen, if.....?  
And try to think of answer before doing experiment. OR To think of connections between two happenings. The possible answer what you guess is called Prediction.

**Example A** What will happen to all plants. If rain does not come for 5 years?  
Since , we know that plants need water to live, we can predict all Plants will die. Also all animals die.

#### Example B Pendulum Experiment

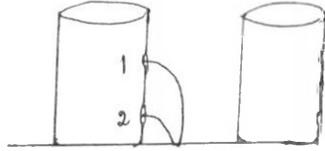


By increasing the length of the thread by 5 cm. Each time. The swing is slowed down. What will happen if the string is made only 3 cm, long.....

**DISCUSSION** with Teacher

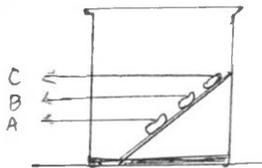
## TRY – IT – YOURSELF

### Activity – 1 Liquid – pressure varies



2 Coke cans with holes (1, 2 and 3)  
How will water flow, If 3 holes are made.  
DISCUSS.

### Activity 2 3 – Bean – Experiment



What will happen to seed (A), seed (B)  
And seed (C) after 10 days.  
Discussion

## PROCESS OF SCIENCE

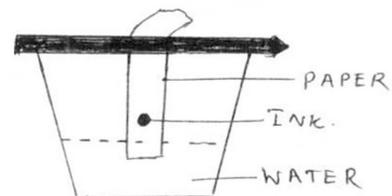
### TRY IT YOURSELF

#### Activity 1 : Climbing ink

1. Make an ink mark on strip of blotting paper [Discuss with your teacher].
2. Hang the blotting paper over a pencil, so that the tip of the paper just touches the water.

The ink climbs up

1. OBSERVE what happens ?
2. RECORD YOUR OBSERVATIONS.
3. RAISE QUESTIONS.
4. EXPLAIN what you see.
5. CONCLUDE.



### Activity 2 : Liquids on Papers

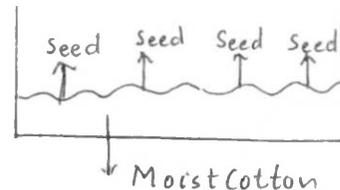
1. Take different kinds of paper given to you.  
a) Tissue paper    b) writing paper    c) butter paper    d) Newspaper
2. On each paper mark small circular mark using a pencil put a drop of oil, ink, water.

OBSERVE what happens ?  
RECORD your observations.  
Rise as many questions as possible.  
Explain your observations.  
Give a conclusion.



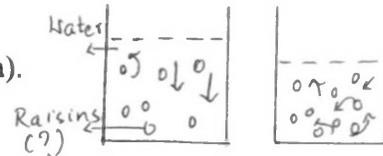
### Activity 3 : 5 Seeds on Moist Cotton – 10 Days Observation.

1. Take small quantity of cotton.
2. Spread it on a card board box.
3. Place a bean seed, mustard seed  
Red chillies seed, date seed.
4. OBSERVE what happens each day.
5. RECORD what you observe.
6. ASK QUESTIONS about your doubts.
7. Explain your observations.



### Activity 4 : Dancing Raisin

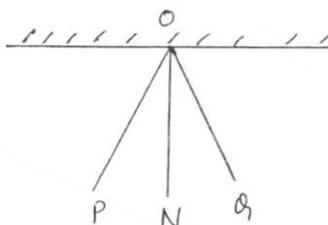
1. Take a glass beaker or a tumbler.
2. Add  $\frac{1}{2}$  cup of water.
3. Add 2 spoons of vinegar.
4. Add a pinch of sodium bicarbonate (baking soda).
5. Put 15 dry raisins Stir once.
6. Observe – What you see ? What you hear ?
7. RECORD your observations.
8. ASK questions ABOUT YOUR DOUBTS.
9. Explain.
10. CAN YOU GIVE ANY conclusion, After adding raisins in plain water in another tumbler.



## PHYSICS ACTIVITIES

### Activity Sheet No. 1 Mirror Experiment

1. Take a mirror given to you and place it on the drawing board to which a paper is fixed. Draw its outline.



2. Draw a ray ON perpendicular to the mirror using a protractor.
3. Keep a refill at an angle to ON.
4. Looking through the mirror, place another refill along OQ such that it is in line with the image of OP.
5. Now change the angle OP and repeat the experiment.
6. What happens to the angle made by OQ as the angle between OP and ON changes?
7. Can you see any pattern in the way the angle changes ?

Measure angle OPN and OQN for the first set and conclude.

## Activity Sheet No.2

### Coin Experiment

1. Flip the coin fifty times and note the number of times you get heads and tails by putting a tick mark in the columns as shown.

Heads	Tails

2. Count the number of times you got heads and the number of times you got tails.
3. Now stand back to back with your friend. Ask your friend to flip the coin and note whether he gets a head or a tail. You make a guess of whether it was a head or tail and note it in your book without asking your friend.
4. After you have finished the experiment compare notes and find out how many times you were correct.

How do you think you happened to be correct ? What do we call this ?

### Activity Sheet No.3

#### Magnetism

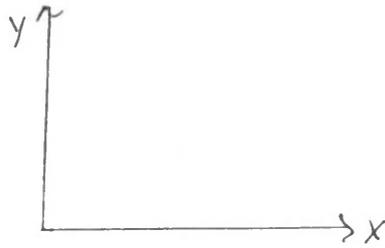
1. Move the given magnet over sand, aluminium block, wooden block, iron filings, sand and iron filings mixture and observe.
2. Classify the given substances into those which are attracted to the magnet and those that are not. What do you call them?
3. What is the shape of the magnet that is given to you? Have you seen magnets of other shapes? List them.
4. Roll the magnet in iron filings. Where do the iron filings cling most? What are these regions called ?
5. Suspend one of the magnets by a thread. Bring another magnet close to it. Observe what happens. Now reverse the magnet and do the same experiment. Record your observations.
6. Take the iron nail on which wire is wound and connect it to a battery. Dip it in iron filings. What do you observe? Does it behave like a magnet?
7. What do you call this magnet? Where are these magnets used ?
8. Fix the magnet to a stand. Suspend one pin/gem clip from it. Now try suspending other gem clips from this pin/gem clip. How many of them can you suspend? What is this property of a magnet called ?
9. Place a sheet of glass or cardboard over the magnet. Spread iron filings on the cardboard. Do you see any pattern ? What do you call this pattern ?
10. Write five sentences to explain the usefulness of magnets.

#### Drawing Graphs

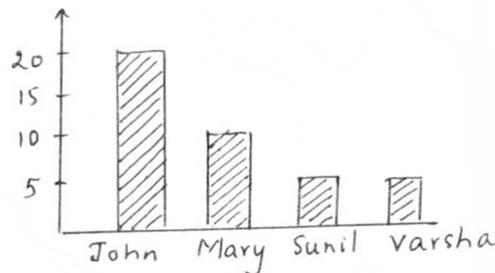
1. Go round your group and find out the birthdays of your friends. Note it in your book.
2. Count the number of birthdays that fall in the months January to December and write them in a tabular column.

Month	No. of Birthdays

3. Draw two lines perpendicular to each other. Along the vertical lines mark the months. This is called the y-axis.
4. Along the horizontal line x-axis mark the number of birthdays as shown below. Represent each birthday by a cake.



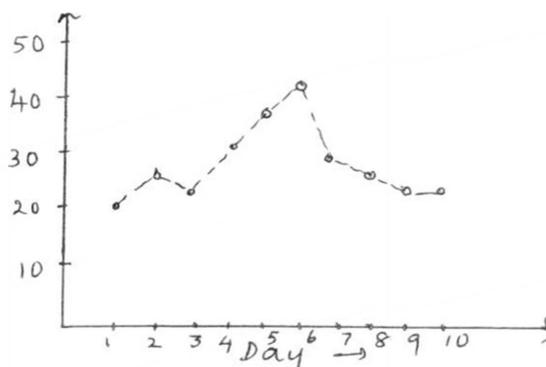
5. What do you call this type of representation as ?
6. In a month there are 40 classes. John was absent for 20 classes. Mary was absent for 10 classes. Sunil was absent for 5 classes and Varsha for 5 classes.
7. Express the number of days the students are absent on a graph using bars.



8. What do we call this graph as ?
9. The temperatures for 10 days were recorded as follows.

Day	Temperature
1	20° C
2	25° C
3	22° C
4	30° C
5	35° C
6	40° C
7	28° C
8	23° C
9	22° C
10	22° C

10. Draw two perpendicular lines as shown below. Mark the days along the horizontal line and the temperature along the vertical line. Join the dots.



## SUMMER SCIENCE CAMP 2006

### SCIENCE QUIZ

**Time : 1 hour**  
**Date : 22.5.2006**

**Name :**  
**School :**

**Answer all questions.**

1. The most intelligent mammal is -----.
2. Name the biggest and the smallest snake in India.
3. Where do you find the lion tailed macaque ?
4. Is snake a vertebrate or a non-vertebrate ?
5. How does the snake recognise smell ?
6. In which parts of the body does the snake bite people ?
7. What is moulting or shedding ?
8. Name the snakes which give birth to the young ones directly.
9. What is the difference between an African and an Asiatic elephant ?
10. Where are sloth bears found ?
11. What is the meaning of 'endemic' species ?
12. Correct the statement "Animals are for us, we are not for animals".
13. White peacocks are found in ----- only.
14. How many species of tigers are extinct ?
15. Which of the white tigers are alive : captive or wild ?
16. Snake expels venom through -----.
17. Give an example of a nocturnal animal.
18. Name the venomous snakes in India.
19. The word XERO in Latin means -----.
20. What are plants which grow in saline water called ?
21. Which planet has prominent rings ?

22. What is the direction in which the earth rotates ?
23. Why is Venus called a morning and evening star ?
24. Which organ is affected by lack of vitamin A ?
25. What are the different marks that are to be observed when we go to buy any product ?

## **VIEWS OF STUDENTS**

When I heard about the summer camp, I thought that it will be just like other summer camps. But it was totally different. It was very useful, very knowledgeable and very nice. We were taught about scientific skills: how to observe, collect data and how the scientist conducts the experiments. Snake Shyam came here and gave a lot of information about snakes. He showed different types of snakes. We were taken to the Karanji lake. We saw many types of birds trees and butterflies. It was a good experience. We went to the Regional Museum of Natural History. There we saw bones and skulls of the different animals we learnt in class. I am very happy and feel proud I attended this camp.

**Abhishek A, VI Std., Rotary West School, Mysore**

In the summer camp, I learnt about food adulteration and how the businessmen add the unwanted waste materials to healthy food for the sake of profit. We learnt to do experiments in physics, chemistry and biology. We got a lot of information about the insects and how to grow plants in a test tube. A project was given to us to work on. We were taken to Karanji Lake and Regional History Museum. We saw many birds and trees and learnt about their characteristics. We studied about snakes through Snake Shyam and zoo people came to our camp to explain to us about animals, we learnt about the different characteristics of animals. We learnt to construct large aeroplanes with sheets of paper. We also learnt to learn the science hidden behind the toys with which we play.

**Samruddhi Kishore  
St. Joseph's Girls High School, Madikere**

In the summer camp, we learnt experiments, Mathemagic, food quality, astronomy, yoga, animation, birds, snakes, environmental education and palm held aeroplanes. We learnt good qualities of nature by going for a Nature Walk and to Karanji Lake and enjoyed the visit to Natural History Museum.

**Vishrutha P.Rao, Pushkarini School**

The Summer Camp was unique of its kind for having focused on various branches of science like Astronomy, Eye-care, food quality, Mathemagic, Nature Walk, Yoga, Computer, Bird Watching, Aeroplanes, Environmental Education, Snakes, science projects which was a wonderful experience. Some of the events like Science projects, scientific skill presentation by Prof.C.G.Nagaraj was very informative. This has helped in understanding as to how a scientist makes observation, analysing, interpreting and hypothesising an event. Moving ahead to environmental education, it was a thrilling experience to know about unusual plants. We got to know about food preparation by plants, the preservation of plants, the fungus formation in plants, etc. Prof.Lalitha explained the mechanism of some toys and the science behind them.

We enjoyed our trip to Karanji lake which was resourceful. Most interesting part of the trip was the Regional Museum of Natural History where we learnt about many some facts of Science.

**Mythri K.Rao, Vijaya Vittala Vidyashale**

The science camp gave us variety of activities throughout. We were shown slide shows on 'Beauty Without Cruelty on birds and animals'. There were demonstrations by Kunigal Ramaswamy on astronomical wonders through the models developed by him. We learnt lot more about sun, moon, earth and other planets in the universe. We had a wonderful session on science projects by Mr.C.G.Nagaraja. He explained certain science activities through a write-up. We were engaged with magic numbers and had fun with numbers and magical squares by Mr.Viswanatha Rao. We also learnt about adulteration in our food and its quality by Dr.Saraswathi. We had lab. sessions in doing experiments in physics, chemistry and botany. We were shown experiments by Dr.P.R.Lalitha and Dr.B.S.Raghavendra. We were also introduced to unusual plants and Tissue Culture by Dr.Anand. We also learnt about animation during the camp. We went round the campus to watch insects, butterflies and plants.

We all enjoyed the nature walk in the Karnaji Lake on a pleasant morning watching variety of birds. We visited Natural History Museum, too. There was demonstration by snake Shyam on Snakes and its importance in the food chain. There were also sessions on yoga and eye-care. We were taken round the Science Park on the campus by Dr.Lalitha and explained the models in the park. In the eight day camp, we enriched our scientific knowledge, doing experiments and increased our understanding of science.

**Sagarikha Kashyap, VI A, DMS**