



# Non-residential Science Workshop

Gurumitkal (December 19-20, 2013)

Yadgir (December 20-21, 2013)

Report by  
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## Preface

The education policy documents such as NCF 2005 and NCFTE have emphasized the need for localized, contextual curriculum-based textbooks and pedagogy. In order to align school curriculum with these policies, the teacher must go beyond prescribed textbooks.

Both Gandhi, who professed education from work and Tagore who professed education from nature, proposed that the teacher must go beyond the prescribed text. According to Gandhi (*Navajivan*, 16 June 1928 (CW 36, pp. 352–3) (Translated from Gujarati),

*“A good teacher would never content himself with summarizing or explaining the meaning of difficult passages. Time and again, he would go beyond the text-books and present his subject to the pupil in a vivid manner in the same way as an artist does. The best text-book may be compared to the best photograph. However, just as a painting by an artist although second rate is invariably superior to a photograph, similar is the case with a real teacher. A true teacher introduces the pupil to his subject, creates in him interest for the subject and enables him to understand it independently”.*

In alignment with the above, District institute Yadgir is striving to support teachers through various activities such as forums, melas, workshops and conferences to enable them to become more effective. The science team in Yadgir planned two-day non-residential workshops as a part of these efforts.

## Objectives

- To create a space for teachers to go beyond textbooks and practice science concepts
- To provide opportunities for peer group learning
- To provide opportunities for self-learning for the team in facilitating and organizing workshops.

## Preparations

Our science team in Yadgir is in itself an experiment. All activities are based on the theme “let us experiment”. The composition of the team is such that each one of us has to learn first and then do the work. Hence while planning for 2013-14, we deliberately placed the workshop activity in the third quarter of the year. From the formation of the team every resource person set ‘facilitating a workshop’ (planning, designing and executing independently) as a primary goal and started their journey towards that. Readings/literature survey, content mapping and lab onsite support during lab manual preparation for high school labs, helped us in enriching our content knowledge. This enabled us in forming and conducting voluntary teacher forums on Saturday/Sundays regularly with the help of three TLCs (Shahapur, Yadgir and Gurmitkal). These forum activities provided us several opportunities to interact with teachers closely to understand them and their needs. Our team also participated in codev activities to acquire requisite capacity in module preparation for workshops and enrichment of content knowledge. All these activities/processes instilled confidence in us to conduct two non-residential workshops at Yadgir and Gurmitkal TLCs.



In consultation with TLC coordinators, teachers and education functionaries, we decided to organize the two day non-residential workshops on 19<sup>th</sup> and 20<sup>th</sup> Dec, 2013 at Gurumitkal and on 20<sup>th</sup> and 21<sup>st</sup> Dec 2013 at Yadgir. The TLC coordinators, Chetan, Roopa, Chandrakant and Hanumanthappa were actively involved in the process of need analysis of teachers, material

procurement and other arrangements from November onwards.

Science team members focused on preparation of modules and materials required for the workshop. Among the team members several meetings and discussions took place for finalizing the module and content. The prepared modules were presented to the team on 6<sup>th</sup> Dec, 2013. Anil Angadki added value to the prepared modules by way of his suggestions/comments. Then the final list of requirements was prepared and shared with TLC coordinators for procurement. With this preparation we arrived at the implementation stage.



With this preparation we arrived at the implementation stage.

#### Schedule of Nonresidential two days science teachers' workshop

Place: Gurumitkal

Date: 19/12/2013 to 20/12/2013

Place: Yadgir

Date: 20/12/2013 to 21/12/2013

#### Day One

Time	Name of the content	Objective	Mode of transaction	Facilitator
9:30 to 10 am	introduction	To understand Participants	Activity of identifying scientist and their inventions	
10:00 am to 1:00 pm	Laws of reflection and Multiple reflection using plane mirrors	To provide experiential learning opportunities to the participants through different experiments	Group activity	Shankar

Tea break : 11:00 am to 11:15      Lunch break : 1:00 pm to 2.00pm

Session – 2

2:00 pm to 4: 30 pm	Image formation by spherical mirrors	To analyze the formation of image by concave and convex mirrors	Group activity	Naseema
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Tea break: 3.00 pm to 3:15 pm

Day -2

Session – 1

9:30 am to 1:00 pm	Exploration of Microscope and Microorganisms	To enable the participants to handle the Microscope and to develop observation skills.	Group activity	Akkamahadevi
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Tea break : 11:00 am to 11:15 am      Lunch Break : 1:00 pm to 2:00 pm

Session – 2

2:00 pm to 4:30 pm	Introduction of Acids , Base and Salts	To give hands on experience of the acids, base and salts.	Group activity	Anand and Pralhad
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4:30 pm to 5:00 pm	Feedback			
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Tea Break : 3:00 pm to 3:15 pm

**19<sup>th</sup> Dec, 2013**

### **Gurumitkal**

As per the schedule the workshop at Gurumitkal began at 9.30 am. Chandrakant Reddy, TLC coordinator, Gurumitkal greeted the gathering in his welcome address. Akkamahadevi, Coordinator, Science team briefed the team about the workshop in her introductory speech.



Mr. Venkat Reddy, BRP, Gurumitkal block and Mr. Narayan reddy, CRP, Gurumitkal cluster were present on the occasion. They encouraged the participants to reap maximum benefit from the workshop.

**20<sup>th</sup> Dec, 2013**

## **Yadgir**

On 20<sup>th</sup> Dec, 2013 as per the schedule, the workshop began at 9.30 am. Chetan, coordinator TLC, Yadgir, extended greetings to the gathering. He in his introductory speech briefed them about the workshop. The participants introduced each other in pairs. The pairing was done through an activity of identifying the scientists and their inventions. For this activity chits containing names of scientists and their inventions were distributed among participants. Then Shankar, resource person, science team, started his session.



In the second session of the day Mr. Prabhu Kannan, BEO, Yadgir, visited the workshop and addressed the gathering. He requested the participants to utilize the workshop to the full extent. He also requested the gathering to practice the learnings from the workshop in classroom.

Since the same modules were transacted in both the workshops a common session flow was maintained. The highlights from the sessions are as follows.

**Highlights of the module:**

- The modules consisted of the topic/concepts that emerged out of the need analysis.
- Biology included exploration of microscope, microbes, and microscopic objects
- In physics, reflection of light by plane mirror and image formation by spherical mirrors was dealt with.
- In chemistry introduction to acids and bases were dealt with.
- Each subject was allotted a session of 3 hours duration.
- Each module consisted of hands-on activities with detailed instructions, points for group discussions, facilitator's instructions, instructions for the group and list of materials.

The session flow for both the workshops was as follows.

**Day one:**

**Session 1: 10 am to 1 pm**

**Facilitator: Shankar**

**Topic: Reflection of Light in Plane Mirror**

Shankar started with the introduction activity. The name of scientists and their inventions were used to pair up participants and introduce the other person in the pair. Then participants are divided into five groups consists of 3 or 4 members.

The discussion about Importance of light in our daily life was done in groups. After the discussion groups presented their points to the gathering.

### Activity 1: Light Travels in a Straight Line



In a group all the participants verified the above statement using candle and a pipe made of chart paper. They rolled the chart paper into a straight pipe and observed the candle through it.

Then they bent the pipe in 'L' shape and observed the candle. After the activity they discussed their observations and concluded that light travels in a straight line.

### Activity 2: Formation of Image in Plane Mirror

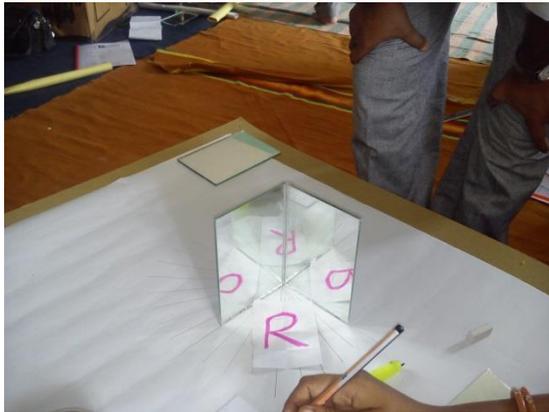
All the participants in groups with the help of a plane mirror studied the formation of images. They observed object and image distance, upright or left-right images, size of the images, etc

Then they wrote their names on a paper (semitransparent) and observed it in the mirror. They compared the same with the back side view looking through paper. After the activity they discussed the findings. They came to the following conclusions:



1. Image is upright.
2. It is the same size as of the object.
3. The image is as far behind the mirror as the object is in front of it.
4. It is reversed, left > right

### Activity 3: Multiple Reflections



All the participants in groups, with the help of two plane mirrors observed the number of images formed by mirrors when held at different angles.

During the observation they noticed that as the angle between the two mirrors increased the number of images formed went on decreasing and they verified the image

formation rule: (No. of images)  $N = (360/A) - 1$ .

Then they plotted a graph with the collected data (N vs A). Then they tried to find the value of N for unknown angles. During the activity a lot of discussion took place. What happens when  $A=0$ , and how to observe the same practically was discussed at length. Then Shankar provided a solution to the practical problem by suggesting that they make a hole in the center of the mirror and try to observe the number of images through the hole.

### Activity 4: Laws of Reflection

All the participants in groups, with the help of a plane mirror, A4 size paper and a toy laser beamer verified the laws of reflection. They folded the paper at 90, 45, 30, and 60 degrees and marked them accordingly. Then they placed a plane mirror so that it is perpendicular to the 90 degree line (fold).



Then they pointed the toy laser beamer at the mirror along different angles on one side of the 90 degree line so that the beam grazes the surface of the paper along the folded line. Then the reflected beam on the other side of the 90 degree line was observed. Each time they found that the angle of incidence is equal to the angle of reflection. And the reflected ray grazes

the surface of the paper. By this activity they validated the laws of reflection.

*First Law of Reflection:*

The incident ray, the reflected ray, and the normal all lie on the same plane.

*Second Law of Reflection:*

The angle of incidence is equal to the angle of reflection.

During the activity they discussed what is meant by the term “same plane”.

The session ended at 1pm for lunch break.

**Session 2: 2 pm to 5 pm**

**Facilitator: Naseema**

**Topic: Spherical Mirrors and Image Formation**

In the second session the same groups continued. It began with a reading activity. The reading materials covered topics such as history of mirrors, specification and explanation for spherical mirrors (concave and the convex), conditions to draw ray diagrams for spherical mirror images, specific terms related to spherical mirrors, focal point and focal length of spherical mirrors, etc. After the reading activity each group presented their understanding on one of the above topics. The facilitator helped the groups whenever additional explanation was needed.

**Activity 1: Image Formation by Concave Mirror**

**Materials:** Concave mirror, mirror stand, scale, candle, match box and screen

The required materials were distributed among the groups. The facilitator, Naseema, had instructed the groups about the activity. The participants conducted the experiments as per the set up. They keenly observed and analyzed the image formed by the concave mirror with respect to the nature of the image as clear, diminished, inverted, or same as the object, real or virtual and specific location of the image formation as at C, beyond C, in between C & F, in between F & P etc. (C= center of curvature, F= Focal point P= pole of the mirror)

(P F= focal length (f)), CP= radius of curvature=2f)

The participants marked the positions C, F and P using the value of 'f' given on the lens cover on a paper.



### Experimental set up:

**Case 1:** When object is placed far from the C, (CP= 2f i.e. 2 times the distance of the focal length)

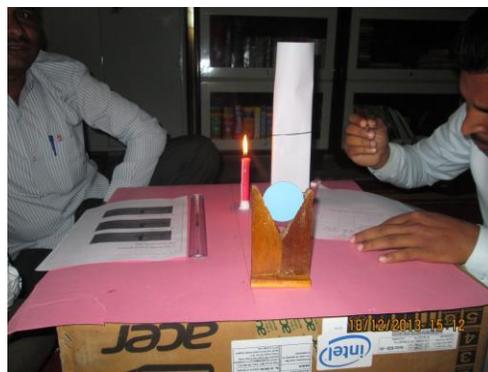
**Case 2:** When the object is placed at C.

**Case 3:** When the object is placed between C and F.

**Case 4:** When the object is placed at F.

**Case 5:** When the object is placed between F and P.

Each group presented their findings and explanation about the experimental facts they performed in the group. The facilitator summarized the findings of the activity in a table to help participants understand better.



## Table of Findings

Observations	When the object is placed far from C.	When the object is placed at C.	When the object is placed between C and F.	When the object is placed at F.	When the object is placed in between P and F.
Image formation point	Between C and F.	AT C. (beside C)	Beyond the C	At infinity	Behind the mirror
Nature of the Image	Real Image	Real image	Real image	Real image	Virtual image
Size of the image as compared to the object	Image size is reduced	Size of the image is same as the object	Image size is larger than the object	Image size is larger than the object (highly enlarged)	Enlarged
Pattern of image formed as compared to the object	Inverted	Inverted	Inverted	Inverted	Erect

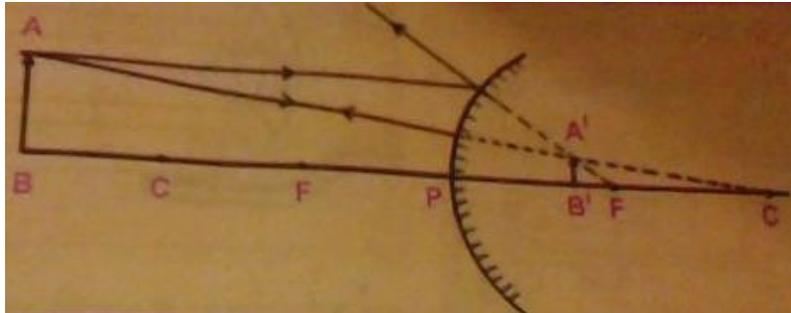
### Conclusion

The nature, position and size of the image formed by a concave mirror depend on the position of the object in relation to points P, F and C. The image formed is real for some positions of the object. It is found to be a virtual image for a certain other position. The image is either magnified, reduced or has the same size, depending on the position of the object. Concave mirrors can produce real and virtual images.

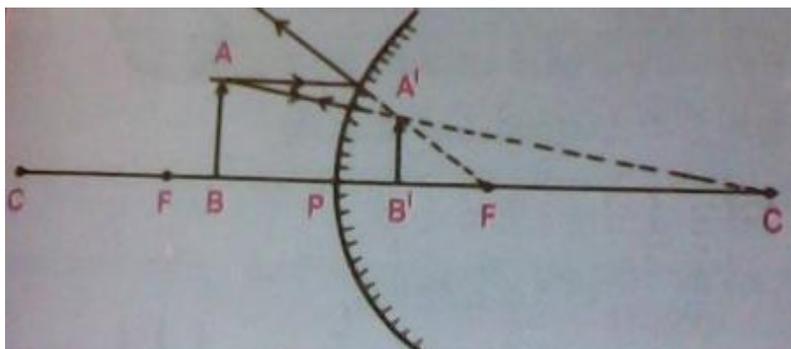
The uses of concave mirrors were also discussed by the participants.

## Activity 2: Image Formation by Convex Mirror

**Case 1:** Object is placed far from C.



**Case 2:** Object is placed between P and F



### Findings

<b>Observations</b>	When the object is placed far from C. (at infinity)	When the object is placed in between P and F.
<b>Image formation</b>	At the focus F, behind the mirror	Between P and F, behind the mirror
<b>Nature of the image</b>	Virtual image	Virtual image

### Conclusion

A convex mirror is sometimes referred to as a diverging mirror due to the fact that incident light originating from the same point will reflect off the mirror surface and diverge. After reflection, the light rays diverge; subsequently they will never intersect on the object side of the mirror. For this reason, convex mirrors produce virtual images that are located somewhere behind the mirror for all position of the object.

## **Day Two**

**Session 1: 10am to 1pm**

**Facilitator: Akkamahadevi**

**Topic: Exploring Microscope, Microbes and Microscopic Objects**

### **Session Objectives**

- To enable participants to know about the microscope and its parts.
- To enable participants to repair the minor defects in the parts of a microscope.
- To know the functions of the different parts of microscope.
- To develop the skill of observation and identification of different microbes and microscopic objects.

### **Materials**

Microscopes, stains (safranin, methylene blue) glycerin, glass slides, coverslips, number 0 paint brush, needles, watch glass, forceps, yeast, spoiled bread, and lemon (fungal growth), use and throw tea cups (transparent), transparent nail polish, soaked seeds (3-4 variety), curd, milk, muslin cloth, different varieties of leaves, capsicum, tomato, onion and ear buds, flowers (hibiscus, cassia, lilly), ink pillar, and tissue paper/ filter paper.

The session started at 10 am. All the participants joined their respective groups formed on the first day. Akkamahadevi started the session by asking a question “How many of you have handled the microscope prior to this workshop?” Only four raised their hands in response. Then she said, “Don’t worry. Today we will play with the microscope as a child plays with a toy.” Then she tossed another question. “When does a child enjoy most while paying with the toy? Some of the teachers answered, “When he breaks the toy.” Then she replied, “Let us play the same way, but with some caution.” She then gave detailed instructions for dismantling and reconstructing microscope.

Each group was supplied with handouts regarding the history of microscope, how to handle it, types of microscopes and their images.

## **Activity:** Dismantling and Reconstructing Parts of a Microscope

### **Materials required:** Microscope

Compound light microscopes were distributed to the groups, asking them to dismantle it.

In a group, half the members dismantled the microscope while the other half reconstructed the same. Discussions took place to identify the parts of microscope. Then each part was named. After this activity each participant had was with a worksheet containing the picture of the microscope without labeling the parts. Participants were asked to label the parts with names. Once they finished this, a sheet containing the correctly labelled picture of the microscope was supplied for reference and cross check. The following points were discussed.

- What are the parts of a microscope? Which lenses are used in the eye piece and objectives?
- What does “10x, 15x, 40x, 100x” written on objectives and eye pieces indicate?
- Can we observe the magnification?
- Are there glasses on both the sides in the eye piece?
- How do they work? Do you think they work like lenses?
- On the lower side, there is a mirror and can you say which type of mirror it is? (connected to the first day mirror activity).



## Activity: Exploration of Microbes and Microscopic Objects

### 1: Observation of Lactobacillus Bacteria in Curd

**Materials required:** curd, slide, coverslips, and methylene blue stain

Instructions given to participants:

Take a drop of sour curd on a glass slide and spread it as a thin layer. Allow it to dry for 5 to 10 minutes and add a drop of methylene blue stain with the help of ink pillar and put a coverslip on it slowly. Then using tissue paper remove excess stain.



Once you have your slide in place on the stage, make sure the low power objective (the shortest objective lens) is in position and turn the coarse focus until the lens is at a position closest to the stage. Set the diaphragm to its largest opening (where it allows the most light through). Then, while looking through the ocular, begin to slowly turn the coarse focus. Turn slowly

and watch carefully. When the specimen is focused under low power, move the slide so that what you want to see is dead-center in your field of view, and then switch to a higher power objective. Do not touch the coarse focus again --- you will break something! Once you are using a high power objective, focus using the fine focus knob only. Be sure to center your specimen before switching to a higher power objective or it may disappear. Try to observe in the field of microscopic view the rod shaped lactobacillus bacteria with the stained color.

The participants were asked to follow the instructions and make the following observations.

### Observations:

- Are these organisms unicellular/multicellular?
- Can you observe the nucleus in the cell?
- Repeat the process for milk using both packet milk and direct milk.

After the observations, the following points were discussed.

- Why do we need to use methylene blue stain?
- Do you find any difference in the prepared slide with regard to curd and milk?
- Do you find any bacteria in packet milk?

**2:** Observation of Protozoa (Paramecium and Diatom) from given sample of water

**Materials required:** Sample water (logged water or 2 to 3 day old seed-soaked water)

### Instructions:

Take a drop of water from the sample through ink pillar and place it on a glass slide and observe under the microscope.



## Observations

Try to observe the moving bodies. If you want you can also use a drop of stain for it. Observe whether these organisms are unicellular or multicellular and note the presence of nucleus inside the cell.

The following points were discussed by the participants.

## Discussion point:

- Are there any moving bodies?
- Can you observe the nucleus in them?

## 3: Observation of Fungi (yeast, aspergillums, ryzopus)

**Materials required:** yeast solution, spoiled lemon, bread, vegetables and roti. (Keep all these 3 to 5 days in an air tight container to allow the fungi grow)

## Instructions

Take a drop of yeast solution from the given sample through ink pillar and place it on a glass slide and observe under microscope.



## Observations:

Try to observe the small circular or oval bodies and some beaded structures. If you want you can also put a drop of stain to get a clear image. Observe whether these organisms are unicellular or multicellular and mark the presence of nucleus inside the cell and the color of the cells.

Similarly you can take some fungus from spoiled roti, bread, vegetable and place it on the slide and wet it with a drop of water and observe under microscope.

After observation the following points were discussed

**Discussion points:**

- Do you observed any nucleus in yeast? Is there any chain of cells?
- Are they unicellular or multicellular?
- What are these organisms that grow on lemon?
- Is there any difference in structure of cells in the sample taken from lemon, roti and bread?

**4: Observation of Plant Cells**

**Requirement:** onion, capsicum, tomato, hydrilla and some leaves.

**Instructions:**

Take a thin outer layer of the onion and put it on a glass slide. Add a drop of safranin stain with ink pillar and put a coverslip on it slowly. Remove any excess stain using tissue paper and observe under the microscope.

**Observations:**

Try to observe the size and shape of the cells and nucleus inside the cell and observe the number of cells present.

Repeat the process for different plant materials like capsicum, tomato and some leaves and observe the different types of cells. After the observations the following points were discussed.

**Discussion points:**

- Do you find any difference in the size of cells?
- Is there any dark colored structure inside the cells? What is it?
- Are these plant materials unicellular or multicellular?

- Do you find any green colored structures inside the cells? What are they?
- What are the small openings you observed in the thin layer of leaf?

## 5: Observation of Animal Cells

**Materials required:** ear buds, slide, coverslip and stain



The participants were given the following instructions and observation points.

### **Instructions:**

Take a little scrape from the cheeks with the help of buds and put on slid and add a drop of water and stain and observe under microscope. The participants followed the instructions and observed

the cheek cells under microscope.

No discussions took place about this activity.

**Plan B Activity:** Classification of specimen pictures into 5 kingdoms (Only carried out in the Yadgir workshop)

**Objective:** To create awareness about 5 animal kingdoms.

**Materials:** Pictures of specimens belong to 5 animal kingdoms, list of kingdom names.

### **Instructions**

In a group discuss and write the names of the kingdoms given in the sheet against the pictures of the specimen. Present your classification to the whole group with reasons why you classified so.

After the activity the participants entered into a discussion.

### **Discussion points:**

- Do you know how the 5 kingdom system came into existence?
- Name any creature not falling into 5 kingdoms.

The session ended at 1 pm for lunch break.

**Session 2: 2 pm to 5 pm**

**Facilitators: Anand and Prahlad**

**Topic: Introduction to Acids, Bases and Salts**

**Objectives:**

- To enable participants to identify the given materials (from real life experience) as acids and bases
- To develop conceptual understanding of acids and bases

Anand started the session with an introduction to acid and bases. He briefly dealt with the meaning of acid and base. And he talked about organic acids and inorganic acids. After the discussion, the participants were involved in activities.

**Activity 1:** Sort the given liquids into acids and bases using litmus paper

**Materials:**

curd, orange juice, NaOH solution, NaCl solution, grape juice, lemon juice, soap water, NaHCO<sub>3</sub> solution, tamarind juice, Na<sub>2</sub>CO<sub>3</sub>, vinegar, blue litmus, red litmus and yellow litmus.



The facilitator clearly instructed the participants about the activity and gave observation sheets to the participants to record their observations. They did litmus paper test for the given liquids and filled the observation sheets.

## Observation Sheet

Sl no/Material	Blue litmus	Red litmus	Yellow litmus
1. Curd	Red	No change	No change
2. Orange juice	Red	No change	No change
3. NaOH	No change	Blue	Red
4. NaCl	No change	No change	No change
5. Grape juice	Red	No change	No change
6. Soap water	No change	Blue	Red
7. Lemon juice	Red	No change	No change
8. NaHCO <sub>3</sub>	No change	Blue	Red
9. Tamarind juice	Red	No change	No change
10. Na <sub>2</sub> CO <sub>3</sub>	No change	Blue	Red
11. Vinegar	red	No change	No change

The participants then asked to sort the given materials into acids, bases and salts using litmus paper.

**Activity 2:** Sort the given solid materials using litmus paper.

Materials required: tamarind, lemon, NaOH pallets, NaCl, Mg, and sulphur

All the participants were supplied with the required materials. The facilitator gave the following instructions:

- Take both types of litmus paper and use it to touch the solid materials given to you.
- Observe any changes in the color of litmus paper and note down your observations in a given sheet.
- Based on color changes, sort them into acids and bases.

After the activity, the facilitator discussed with the participants their observations. He concluded that the acids show their acidic nature in aqueous solutions and not in the solid phase with litmus paper. He also mentioned the pH definition and why pH ranges from 0 to 14. And he compared both activities. Then he mentioned the Arrhenius theory.

“Arrhenius theory states that an acid is any substance which dissociates into hydrogen ion (H<sup>+</sup>) while a base is any substance which dissociates into hydroxide ions (OH<sup>-</sup>).”

### Activity 3: Formation of Acid by Acidic Oxides.

**Materials required:** sulphur powder, long handle spoon, gas jar, lamp, match box, water, litmus paper, glass rod.

Each group was supplied with the above set of materials. The facilitator gave the following instructions to the participants.

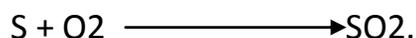
- Take 5gm of sulphur powder in the given spoon; burn the powder with the help of lamp. Keep the burning powder into the gas jar and collect the gas of the sulphur.
- Add 100 ml of water into the gas jar and mix with the help of a glass rod.



Now test the solution with the help of both wet litmus paper and note down the observations. After the activity, facilitator asked the following questions to the participants:

- What happens when sulphur burns in the presence of air?
- Can you write the chemical reaction for above process?
- What is the difference between sulphuric and sulphurous acids?

Then the facilitator noted the chemical reaction:



Then he discussed the formation of acids through above reactions. He also dealt with the difference between sulphuric and sulphurous acids.

The remaining part of the session was facilitated by Pralhad.

### **Activity:** Formation of Bases by Basic Oxides

**Materials Required:** magnesium file, sodium metal, water, test tubes (3), a pair of tongs, blue and red litmus paper, lamp, match stick, glass rod.

All the groups were given the above materials. For two groups, magnesium foil and for other groups sodium metal was given. The facilitator gave the following instructions.

#### **Instructions for magnesium test group:**

- Take 5cm of magnesium file, with a pair of tongs, and burn it in presence of air.
- Wait till magnesium burns completely then collect the white ash in the test tube.
- Add 10 ml of water to the ash; mix well with the help of a glass rod.
- Now take both wet litmus paper and dip it in the solution one by one and note down the observations.

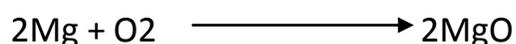


#### **Instruction for sodium test group:**

- Take a test tube and add 5ml of water
- Take a pinch of sodium metal piece and slowly put it into water and allow the sodium metal to react with water completely.
- After some time sodium metal completely disappears. Then test with both wet litmus paper and note down observations.



After the activity each group shared their observations before the gathering. Then the facilitator discussed the chemical reactions involved in the activity.



Then he explained how some metals react with air and some metals react with water and give basic oxides. Then these basic oxides react with water to form

bases. He also discussed some general properties of bases like taste, reaction with acids, color changes with litmus paper test, etc. He also covered chemical reactions and electronic configurations. Some of the participants wanted to know the difference between valence electron and other electrons.

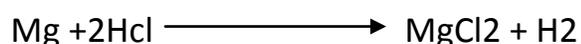
**Activity:** Test of Acids Using Metals

**Materials:** 10ml dilute HCL solution, magnesium foil, test tube,

The groups were supplied with the above materials. The facilitator instructed them about the process.



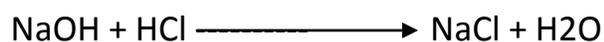
Participants tested how magnesium reacts with HCl and gives rise to magnesium chloride and liberates hydrogen gas. The liberated gas was tested with a burning match stick. And participants confirmed that the gas was hydrogen by hearing puff sound when hydrogen burns. Participants enjoyed this activity. Then facilitator explained the chemical reactions involved in the activity.



**Activity:** Neutralization Reaction

**Materials:** 10ml 1% NaOH solution, 10ml 1% HCL solution, litmus paper, beaker

The participants tested the definite proportion of acid or base reacting with each other and giving rise to salt and water. The formed product is neutral in nature and was tested with litmus paper. Then facilitator discussed the chemical reactions involved.



## Interaction between Teachers and DIET Personnel During the Workshop:

DIET personnel from various NEK districts attended a three day workshop on orientation to 12<sup>th</sup> five year plan at Yadgir District Institute from 17<sup>th</sup> Dec, 2013 to 19<sup>th</sup> Dec, 2013. On 19<sup>th</sup> they visited TLC Gurumitkal to understand the TLC activities. They observed the science workshop and interacted with the participants. Excerpts from a report on the workshop for DIET personnel in NEK on the 12<sup>th</sup> Five Year Plan which contains interaction details are given below.



### In TLC - Gurumitkal:

#### **1. What kind of change did you bring in your teaching learning process from TLC?**

We can utilize the teacher learning materials to conduct experiments in the schools which help making teaching learning processes effective.

#### **2. Did you share this experience with your colleagues?**

We informed all our colleagues and friends about TLC and motivated them to visit.

#### **3. So far how many teachers have visited the TLC?**

Around 30-40 teachers visit the TLC.

#### **4. Why are teachers not showing interest in visiting the BRCs and other sources where the Department is providing all resources?**

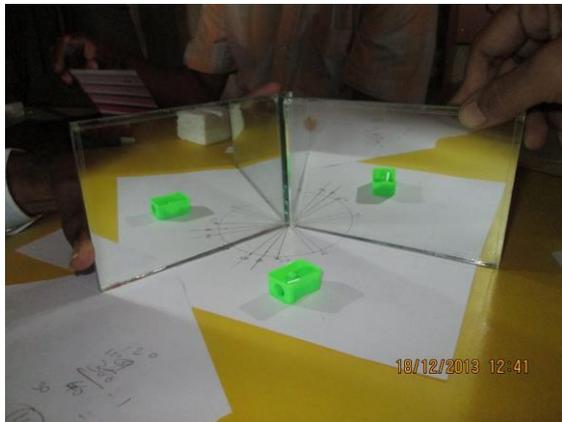
One of the reasons why we visit TLCs is that it is very close to our homes. And we find more resources and they are open on Sundays. Regular forum activities also take place here.

On 21<sup>st</sup> Dec, 2013, Mr. Rudresh, Leader, Yadgir District Institute visited the Yadgir TLC and he addressed the participants. He referred to NCF 2005 and requested the participants to read NCF position paper on science education prepared by the focus group on science.

# Photo gallery

## Gurumitkal

### Day-1



## Day-2



Yadgir

Day-1



## Day 2



**Feedback by Participants:**

1. The sessions were good.
2. It would be useful to have the explanations in the form of reading materials.
3. Avoid using English words during the session.
4. The session did not have very new and useful content for the TGT teachers. (TGT teacher expressed)
5. Light experiments gave practical experience. The same can be done with children. The chapter on light is difficult to teach. This workshop has given experimental learning about light.
6. Acid/base activity provided the experience on how to teach with daily life experience, and think about chemical equations that are difficult to deal with children.
7. The activity on microscopes helped to understand its parts and their functions. It also enabled us to repair minor problems of the microscope.
8. We learnt how to mount the specimen and observe the same through microscope.
9. Some extra details about microbes were needed.
10. The selected topics should be dealt with in depth. We expected more.
11. One of the participants expressed interest to serve as a resource person.

**Insights:**

1. The regular engagement with teachers through forums and workshops will help in building relationship with them.
2. The activities providing hands-on experience to the teachers are crucial to the science workshops.
3. Teachers are willing to learn and are always looking for better opportunities.
4. Our support to the teachers will persuade them to reform their classroom practices.
5. These engagements will ensure the creation of resource persons within the government system.

## **Learnings:**

1. All of us learnt how to plan, prepare and facilitate a workshop.
2. To facilitate a workshop, clarity in concepts and understanding of the subject is absolute necessary.
3. All the facilitators should hone their communication skills and session moderation skills.
4. During the preparation for the workshop we learnt lot of concepts in our areas of expertise and in other areas too.
5. We learnt how to coordinate between different people like, TLC coordinators, teachers, education functionaries, etc.
6. We learnt that workshops are different from forums. Workshops demand less content, deeper discussions.
7. Along with practical experiences theoretical aspects are also necessary.
8. We should give sufficient time to design a workshop.
9. Prior understanding of the target group is essential for the workshop.
10. Coordination between co facilitators is crucial.

Our “let’s experiment” activities finally culminated in this workshop for this academic year. The team’s dream to conduct two days’ workshop came true with the support of all colleagues in the district institute, TLC coordinators, leaders, teachers and education functionaries. The science team extends its sincere thanks to all of them. Mr. Anil in spite of his busy schedule at the school participated in the workshop. He added his valuable comments during the internal feedback sessions. For his cooperation, science team extends special thanks to him.



Akkamahadevi Patil

Annexure 1: List of Participants in Science Workshop at Gurumitkal

<b>Sl No</b>	<b>Name of the Teachers</b>	<b>Designation</b>	<b>Current working school</b>	<b>Contact Number</b>
01	Sri Venkatesh	Science Teacher	GHPS Kakalwar Base GKL	9845524259
02	Sri Hanumantha	Science Teacher	GHPS Himalpur	9591515243
03	Sri Girish	Science Teacher	GHPS Rampur	9972272047
04	Sri Shivaraj Saka	TGT	GHPS Keswar	9008265001
05	Sri Kista Reddy	Science Teacher	GHPS Chappetla	9901261539
06	Sri Gopal Krishna	Science Teacher	CPS Gurmitkal	9845150427
07	Buggappa.T.sindhe	Science Teacher	Gyanodaya Patasala Gkl	9611652929
08	Smt Veena	Science Teacher	HPS Vidya Jhothi Gkl	8147350989
09	Smt Parvathidevi	Science Teacher	Shanthveer High school Gkl	
10	Sri Balappa	Science Teacher	GHPS Putpak	9845974613
11	Sri Srinivash	TGT	GHPS Budur	9731045523
12	Sri Ravi Kumar	Science Teacher	GHPS M.T.Palli	9611715393
13	Sri Suresh Kumar	Science Teachers	GHPS Hossalli	9902876862
14	Sri B.N Venkatesh	Science Teacher	GHPS Mallayyakatta	9845992478
15	Subhash Chawan	Science teacher, High school	Govt Jr College Gkl	9901136031
16	Khaja Hussein	Science	Govt Jr College Gkl	8123356884

		teacher, high school		
17	Sri Jeevan Reddy	Science Teacher	GHPS Gajarakot	9916345859
18	Sri Narayan Reddy	CRP	Gurmitkal Cluster	9945207618
19	Sri Venkat Reddy	BRP	Gurmitkal Block	9482149427

Annexure 2: List of participants -Science workshop at Yadgir

SI NO	Name of the teacher	School	Cluster	Contact no
1	Usha ritti	GHPS Koiloor	Rural	8970573259
2	Rameshkumar	GHPS Sawoor	Malhar	9482055506
3	Shahista banu	GHPS Kawloor	Malhar	8497876412
4	Bangarappa	GHPS Bachwar	Hattikuni	9739512175
5	Jyotilakshmi	GHPS Ambedkar nagar Yadgir	Urban	9916051690
6	Subhash	GHPS Mundaragi	Ramsamudra	9663878692
7	Suma	GHPS Kyasapnalli	Alipur	9686565162
8	Gangamma	GHPS Horuncha	Alipur	9880999134
9	Savitramma	GHPS Kanchagarhalli	Alipur	
10	Ambika	GHPS Venkateshwar nagar Alipur	Alipur	9008996367
11	Shaila jyoti	GHPS Koliwada	Rural	9742831983
12	Sarvamangala	GHPS Ramsamudra	Ramsamudra	

#### TGT Teachers list

1	Rajshree	GHPS Aashnal	Ramsamudra	9731772987
2	Sharanappa	GHPS Thangundi		9945305401
3	Prameela M S	GHPS Abbetumkur	Station Bazar	9731882002
4	Shilpa	GHPS Koiloor	Rural	8095423880
5	Maheshkumar	GHPS Belgeri	Ramsamudra	9900845572
6	Renuka	GHPS Yeddalli	Hongera	9448386577

