Non-residential Science Workshop

Gurumitkal (December 19-20, 2013)
Yadgir (December 20-21, 2013)

Report by
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Science team

Yadgir District Institute
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\textsuperscript{th} and 20\textsuperscript{th} Dec, 2013 at Gurumitkal and on 20\textsuperscript{th} and 21\textsuperscript{st} 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 6th 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.

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**

<table>
<thead>
<tr>
<th>Time</th>
<th>Name of the content</th>
<th>Objective</th>
<th>Mode of transaction</th>
<th>Facilitator</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:30 to 10 am</td>
<td>introduction</td>
<td>To understand Participants</td>
<td>Activity of identifying scientist and their inventions</td>
<td></td>
</tr>
<tr>
<td>10:00 am to 1:00 pm</td>
<td>Laws of reflection and Multiple reflection using plane mirrors</td>
<td>To provide experiential learning opportunities to the participants through different experiments</td>
<td>Group activity</td>
<td>Shankar</td>
</tr>
<tr>
<td>Session – 2</td>
<td></td>
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<tr>
<td>2:00 pm to 4:30 pm</td>
<td>Image formation by spherical mirrors</td>
<td>To analyze the formation of image by concave and convex mirrors</td>
<td>Group activity</td>
<td>Naseema</td>
</tr>
</tbody>
</table>

| Tea break: 3.00 pm to 3:15 pm |

<table>
<thead>
<tr>
<th>Day -2</th>
</tr>
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<tbody>
<tr>
<td>Session – 1</td>
</tr>
<tr>
<td>9:30 am to 1:00 pm</td>
</tr>
</tbody>
</table>

| Tea break : 11:00 am to 11:15 am | Lunch Break : 1:00 pm to 2:00 pm |

<table>
<thead>
<tr>
<th>Session – 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:00 pm to 4:30 pm</td>
</tr>
</tbody>
</table>

| 4:30 pm to 5:00 pm | Feedback |

| Tea Break : 3:00 pm to 3:15 pm |
19th 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\textsuperscript{th} Dec, 2013

Yadgir

On 20\textsuperscript{th} 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 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 glazes 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

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

### 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

<table>
<thead>
<tr>
<th>Observations</th>
<th>When the object is placed far from C. (at infinity)</th>
<th>When the object is placed in between P and F. (BP&lt; f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image formation</td>
<td>At the focus F, behind the mirror</td>
<td>Between P and F, behind the mirror</td>
</tr>
<tr>
<td>Nature of the image</td>
<td>Virtual image</td>
<td>Virtual image</td>
</tr>
</tbody>
</table>

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 are 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, hydrida 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 slide 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, NaHCO₃ solution, tamarind juice, Na₂CO₃, 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.
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+) while a base is any substance which dissociates into hydroxide ions (OH−).”
**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:

\[ S + O_2 \rightarrow SO_2. \]

\[ SO_2 + H_2O \rightarrow H_2SO_3. \]

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.

\[2\text{Mg} + \text{O}_2 \rightarrow 2\text{MgO}\]
\[2\text{Na} + 2\text{H}_2\text{O} \rightarrow 2\text{NaOH} + \text{H}_2\]

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.

\[ \text{Mg} + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{H}_2 \]

**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.

\[ \text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} \]
Interaction between Teachers and DIET Personnel During the Workshop:

DIET personnel from various NEK districts attended a three day workshop on orientation to 12th five year plan at Yadgir District Institute from 17th Dec, 2013 to 19th Dec, 2013. On 19th 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 12th Five Year Plan which contains interaction details are given below.

In TLC - Gurumitkal:

<table>
<thead>
<tr>
<th>1. What kind of change did you bring in your teaching learning process from TLC?</th>
</tr>
</thead>
<tbody>
<tr>
<td>We can utilize the teacher learning materials to conduct experiments in the schools which help making teaching learning processes effective.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Did you share this experience with your colleagues?</th>
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<tbody>
<tr>
<td>We informed all our colleagues and friends about TLC and motivated them to visit.</td>
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<thead>
<tr>
<th>3. So far how many teachers have visited the TLC?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Around 30-40 teachers visit the TLC.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Why are teachers not showing interest in visiting the BRCs and other sources where the Department is providing all resources?</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
</tr>
</tbody>
</table>

On 21st 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

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name of the Teachers</th>
<th>Designation</th>
<th>Current working school</th>
<th>Contact Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sri Venkatesh</td>
<td>Science Teacher</td>
<td>GHPS Kakalwar Base GKL</td>
<td>9845524259</td>
</tr>
<tr>
<td>02</td>
<td>Sri Hanumantha</td>
<td>Science Teacher</td>
<td>GHPS Himalpur</td>
<td>9591515243</td>
</tr>
<tr>
<td>03</td>
<td>Sri Girish</td>
<td>Science Teacher</td>
<td>GHPS Rampur</td>
<td>9972272047</td>
</tr>
<tr>
<td>04</td>
<td>Sri Shivaraj Saka</td>
<td>TGT</td>
<td>GHPS Keswar</td>
<td>9008265001</td>
</tr>
<tr>
<td>05</td>
<td>Sri Kista Reddy</td>
<td>Science Teacher</td>
<td>GHPS Chappetla</td>
<td>9901261539</td>
</tr>
<tr>
<td>06</td>
<td>Sri Gopal Krishna</td>
<td>Science Teacher</td>
<td>CPS Gurmitkal</td>
<td>9845150427</td>
</tr>
<tr>
<td>07</td>
<td>Buggappa.T.sindhe</td>
<td>Science Teacher</td>
<td>Gyanodaya Patasala Gkl</td>
<td>9611652929</td>
</tr>
<tr>
<td>08</td>
<td>Smt Veena</td>
<td>Science Teacher</td>
<td>HPS Vidya Jothi Gkl</td>
<td>8147350989</td>
</tr>
<tr>
<td>09</td>
<td>Smt Parvathidevi</td>
<td>Science Teacher</td>
<td>Shanthveer High school Gkl</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sri Balappa</td>
<td>Science Teacher</td>
<td>GHPS Putpak</td>
<td>9845974613</td>
</tr>
<tr>
<td>11</td>
<td>Sri Srinivash</td>
<td>TGT</td>
<td>GHPS Budur</td>
<td>9731045523</td>
</tr>
<tr>
<td>12</td>
<td>Sri Ravi Kumar</td>
<td>Science Teacher</td>
<td>GHPS M.T.Palli</td>
<td>9611715393</td>
</tr>
<tr>
<td>13</td>
<td>Sri Suresh Kumar</td>
<td>Science Teachers</td>
<td>GHPS Hossalli</td>
<td>9902876862</td>
</tr>
<tr>
<td>14</td>
<td>Sri B.N Venkatesh</td>
<td>Science Teacher</td>
<td>GHPS Mallayyakatta</td>
<td>9845992478</td>
</tr>
<tr>
<td>15</td>
<td>Subhash Chawan</td>
<td>Science teacher, High school</td>
<td>Govt Jr College Gkl</td>
<td>9901136031</td>
</tr>
<tr>
<td>16</td>
<td>Khaja Hussein</td>
<td>Science</td>
<td>Govt Jr College Gkl</td>
<td>8123356884</td>
</tr>
</tbody>
</table>
### Annexure 2: List of participants - Science workshop at Yadgir

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

### TGT Teachers list

<table>
<thead>
<tr>
<th>SI NO</th>
<th>Name of the teacher</th>
<th>School</th>
<th>Cluster</th>
<th>Contact no</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rajshree</td>
<td>GHPS Aashnal</td>
<td>Ramsamudra</td>
<td>9731772987</td>
</tr>
<tr>
<td>2</td>
<td>Sharanappa</td>
<td>GHPS Thangundip</td>
<td></td>
<td>9945305401</td>
</tr>
<tr>
<td>3</td>
<td>Prameela M S</td>
<td>GHPS Abbetumkuru</td>
<td>Station Bazar</td>
<td>9731882002</td>
</tr>
<tr>
<td>4</td>
<td>Shilpa</td>
<td>GHPS Koiloor</td>
<td>Rural</td>
<td>8095423880</td>
</tr>
<tr>
<td>5</td>
<td>Maheshkumar</td>
<td>GHPS Belgeri</td>
<td>Ramsamudra</td>
<td>9900845572</td>
</tr>
<tr>
<td>6</td>
<td>Renuka</td>
<td>GHPS Yeddalli</td>
<td>Hongera</td>
<td>9448386577</td>
</tr>
</tbody>
</table>