



FORMATIVE ASSESSMENT

We have to assess and note down the remarks observation in the process of learning by the students during teaching learning. Such activity to enhance the students learning is called formative assessment. This assessment is conducted in the fearless atmosphere in the classroom. It also helps the children to accelerate their learning. In this formative assessment the teacher observes and record the process of students learning regularly in various situations and he acts as facilitator by correcting the mistakes of the students. Hence, it is diagnostic and remedial tool in teaching learning process to encourage better performance of the child not merely depending up on the declaration of marks and grades.

Formative assessment is carried out the teaching learning process. Which means discussing the concepts, problems and exercises. This can be performed either in written form or oral which child's reflections in understanding a concept, problem solving, proofs is assessed in the form of projects, slip tests, projects etc. The students are assessed not only in classroom but also outside the classroom or in leisure times. The process of learning, conceptual understanding and the extent of learning is assessed in formative assessment. In this assessment, there is no place for copying from guides or blackboard on fellow student's notebook. The student is given regular feedback by the teacher and given chance for self learning while learning in the classroom misoptions are corrected during this assessment. The properties of formative assessment which is useful for self learning are in the following way.

Salient features of Formative Assessment :

- It is a process of Observation how the child is learning and how child's progress is while teaching learning process going on.
- It is intended to diagnose the problems of a child while learning and to give remedial support.
- It provides absolute feedback of teaching - learning process at a particular stage.

- It gives reasons for why children are backward in learning a concept or unit. as per those reasons, we can change or choose alternative teaching learning strategies.
- It helps the children learn themselves and make them involve in the learning process.
- It is useful in children's self evaluation, which helps the children to improve their learning capacity.
- It provides many opportunities for the child to adopt different learning styles / methods.
- It provides different assessment tools, not only paper pencil test, but also provides different tools like interactions, discussions sharing experiences.
- Children donot feel stress because it is conducted in natural learning environment.
- Teacher observes the progress of children while teaching learning process is going on and based on his observations, teacher may come to a conclusion regarding the learning of the child in formative assessment.

FORMATIVE ASSESSMENT - TOOLS :

As a part of teaching learning process, we provide different activities to the children for conceptual understanding. In mathematics children can generatize or draw some principles by solving example problem for proving theorom or statement. We provide different activities to children and we make the children to participate in these activities. We can estimate the progress of the children in this process. Without involvement or colaboration of children, there is no scope for comprehensive learning. Hence, teacher has to make the children to involve in the learning process continuously and estimate their progress.

Textbook is helping tool in this process. For conceptual understanding, teacher organizes soem activities in the classroom. Before conducting an activity (which is in the text book) teacher asks the students to read the text related to the concept or activity and asks them to identify the new concepts, mathematical words or symbols. Then teacher discusses them in whole class and make students understand that new concepts etc.

Then the children has to participate in the particular activity. For observng the comprehension of the children, teacher provides more activities, like model problem solving. Which is useful for developing problem solving skills. While solving model problem teacher poses oral questions to the children and children gives answers. Some times children may asks questions for more comprehension. Then if we ask the children to solve the problems on black board, they come forward and solve the problem.

After understanding a particular concept by solving example problems, children can do problems in "do this" title. By discussing in groups and sharing their ideas, children can solve the problems of "Try this" and "Think and discuss" : In these contexts children can solve similar problems given by the teacher from outside the textbook with the help of peer group.

Teacher has to discuss in the classroom with those children regarding how to solve the exercise problems. At this stage children has clear understanding on the concepts which are involved in the exercise. After the discussion children have to solve the exercise problem on their own. Moreover, students participation project works in groups and present reports. Thus teacher has to observe that how the children are comprehending the concept, how they are achieving such academic standards, how they are learning, how they are involving in the activity.

For this, teacher has to use some prescribed tools to assess the progress of the children, while teaching learning process is going on. Now, we observe the tools and allocation marks for each tool in Formative Assessment.

- (1) Creating or making new problems - 5 marks.
- (2) Children's written work - 5 marks.
- (3) Project work - 5 marks.
- (4) Slip Tests - 5 marks.

Thus, 20 marks are allotted for Formative Assessment in 10th class public examinations. This should be process implemented for Class 9 and 10 formative assessment.

Above tools are to be conducted as a part of teaching learning process. But they should not be conducted as unit test in a sheduled time or date. That means these must be conducted while teaching learning process is going on :

- Discussing with children.
- Conducting activities.
- Asking questions.
- Ask the children to solve the problems on black board.
- Giving home work on solving problems.
- Asking the children to create or generate new problems by innovations, discoveries, inventing new concepts.
- Ask the children to solve 2 or 3 problems instantaneously. Conducting small slip tests.
- Ask the children to write their openions on a particular issue / concept.
- Data collection - analysis - writing reports.
- Conducting projects - writing reports etc.

Considering all the above activities; we have to assess the progress of the children.

Formative Assessment - Implementation :

Formative Assessment has been included in 10th Class public examinations. For Formative Assessment 20 marks are allocated. In these 20 marks, 5 marks for 'Creating new problems by children', 5 marks for 'Children's written work', 5 marks for 'slip tests' and 5 marks for 'Project work'. This method is going to be implemented for 9th & 10th Class from academic year (2014-15) onwards. Hence now we will know about the implementation and how to carry out each tool.

1) Creating or making new problems by Children :

Teacher has to make the children create new problems on a given concept on their own. In this context teacher has to assess in the created problem what the concepts are, what the logic is in that problem, what the complexity is, in how many steps that problem is solved, how many procedures are involved, whether they are related to daily life situations or not? and observe their progress. But merely changing names, numbers and signs in the textual problems should not be regarded as creating new problems. Keeping in view of all the above issues, the teacher ought to support the children in creating / making new problems on a given concept. The problems which are being created by children must be included challenge in the problem solving and should lead to creative thinking. After creating new problem, teacher ought to make the children to solve those problems on their own.

Implementation :

As a part of formative assessment, 5 marks are allotted to "Creating new problems". To implement this tool, teachers have to follow the following indicators :

- In a academic year, as a part of formative assessment, conduct it and record the marks 4 times (formative assessment wise).
- In every formative assessment, marks should be awarded for 10 marks and Note down for 5 marks in records. At year ending, we should count the total marks in 4-formative assessment, for 20 marks, then reduce the achieved marks for 5 marks.

Ex : A student got 16 marks out of 20 marks in four formative assessments, then reducing the achieved marks for 5 marks, that means the student got 4 marks out of 5 marks. (i.e. $\frac{16}{20} \times 5$)

- However for 9th & 10th classes, we have to record the marks & grades for reducing 5 marks only, in spite of calculation for 10 marks. This may be continued in four formative assessments.
- Make the children to create new problems on given concepts, for this one note is maintained by the children. Teacher has to award the marks for this as per the indicators.

- In a period of formative assessment while awarding marks for this tool, Consider completed lessons in a particular formative assessment period. Based on that chapters or concepts only. children have to prepare or create new problems.
- That means, if a single chapter is completed, in a formative assessment period, then the children have to create at least 5 new problem based on the concepts in the chapter. If two chapters are completed, then children have to prepare total 10 problems at the rate of 5 problems for each chapter's concepts.
- If children are not able to create new problems on given concepts, then teacher has to take initiation and discuss the daily life situations which may occur the concept. By whole class discussion, teacher has to make the children to create new problems.
- According to the above indicators only marks should be awarded and recorded in a proper way.
- In monitoring or inspections the school authority must show the records and notebooks.

2) Children's written work :

5 marks have been allotted in 10th class public examination for this tool . There marks also should be considered as children's progress. We have to observe that whether the children are writing the notes on their own or not. They should solve the problems on their own in the class room activity or home work. That means, we have to make sure that they are solving the problems on their own under "do this", "try this" and "think and discuss". Students has to solve the exercise problems on their own which are discussed. But not copying form other sources. Some logical questions are asked here and there in the chapter the reflection of children on different on these questions in text book and beyond text book. The classwork or home work must be maintained in a note book. Thus note books, home work notes, filling some table in the textbook, assignments, fortfolios etc are considered as written work of a child. Base on the child's written work, his / her progress should be assessed. We should follow the following indicators.

Implementation :

- Though 5 marks are allotted to this tool, we have to conduct this for 10 marks in each formative assessment.
- In four formative assessments the achieved marks out of 40 marks are to be reduced to 5 marks for recording.
- By implementing this method in 9th & 10th Classes, we can assess the progress of the children upto public examination. But children's progress must be recorded formative assessment wise, out of 5 marks only.

- We have to observe that, whether the children are able to solve problems under "do this" activity - individually on their own.
- Similarly, we have to observe that how the children are solving the problems under 'try this', 'think and discuss and write'. And we have to observe whether they are doing homework on their own or not? How they writing in the note book?
- And we have to observe that, whether they are copying the procedures / solutions from otehrs or guids etc. consider the problems which are solved by themselves only for assessment and treat them at correct.
- After confirming the children solved the problems on their own, we should award the marks / grades. Make sure that students are not copying down from other sources like guides, others note. If they copy from other sources, then award zero marks for that.
- Therefore, make the children to solve the problems on their own only, and by this way we have to assess their progress.

3) Slip Test :

Sliptest may be conducted right then and there when the teacher wants there is no need of prior plan and prior information to be given to children. For conducting theis sliptest. This must be conducted in the instructional period only. Slip test may conducted to assess the children understanding of the what they have understood the one or two chapter, which are completed in a formative assessment period. And it may be conducted to test one or two / more concepts but with entirely new problems. This is meant for evaluating one or two competencies i.e. problem solving, Reasoning proof, etc.

5 marks are allotted to sliptests in 10th class public examinations. So, sliptest must be conducted in each formative assessment period. It should be conducted in the class room within 45 min. only for this. Teacher has to write the questions / problems on the black board and instruct the children to write the answers. Thus teacher has to correct their answer scripts and assess their progress. Regarding sliptest, we have to follow these indicators / suggestions.

Implementation :

- It is not a unit test as we conducted previously. Without giving prior notice, slip test should be conducted in a transactional period in a context of teaching learning process.
- Though 5 marks are allotted to slip test, in our regular class room, we have to conduct slip test for 20 marks in each formative assessment. The achieved marks are reduced for 5 marks for the record.
- After 4 formative assessments, average of 4 sliptests should be sent to public examinations board.
- This method must be implemented in 9th, 10th classes as a part of formative assessment. And in this way we assess their progress and record it. But we should dislapaly slip tests marks for 5 marks everytime in record.

- Separate note book must be maintained by the children for slip test. And let them write the answers in that note book only.
- After conducting the slip test, teacher has to correct their answers and discuss them in the class room and make the children to their mistakes and let them correct.
- 200 pages note book must be maintained by every child. In that note book, formative assessment period wise for creating new problems, slip test and project works should maintained at a place. Let the children write all the three items in that only. Teacher has to observe these and correct them.

4) Projects :

The cardinal principles of project work / method are: (i) learning by doing and (ii) learning by living, definition of the word project: The term project has been defined by a number of people. According to Parker - 'A project work is a unit of activity in which pupils are made responsible for planning and purposing'.

According to J.A. Stevenson, 'A project is a problematic act carried out for completion in its natural setting'.

According to W.H. Kilpatrick, 'A project is a whole - hearted purposeful activity proceeding in social environment'.

According to Ballard, - 'A project is a bit of real life that has imparted into school'.

Principles underlying the project method are:

- | | |
|----------------------------------|-------------------------------|
| (i) Principle of freedom | (ii) Principle of reality |
| (iii) Principle of purpose | (iv) Principle of Experience |
| (v) Principle of sociability | (vi) Principle of utility |
| (vii) Principle of co-ordination | (viii) Principle of interest. |

The main purpose of the project work is to incorporate or enhance the collaborative learning skills, leadership qualities, life skills. And make the learning joyful, by this evaluation of learning will be come as joyful activity.

By this project method, some process skills like, observation, hypothesizing, invention, discovery, experimentation etc. will be developed. Children may participate in teaching learning activity enthusiastic. In languages and non-languages children can construct knowledge on their own by this project method. On a given topic, student / students can discuss thoroughly, and analyze the problem in multiple angles, observe and supporting is main objective of this work. By this method, a self learning, drawing generalization from their experiences or what they learnt, collection of data regarding new topic preparing models, analysing the problems or data, sharing experiences with others, representation of graphs regarding data, etc., will be developed among the students.

As a part of formative assessment 5 marks are allotted for project work in SSC - Public examination. Therefore project work is considered as a part of teaching learning process and it should be conducted in every formative assessment period and the progress of the student must be assessed.

Steps in project work:

- 1) Providing a situation
- 2) Choosing and purposing
- 3) Executing
- 4) Evaluating
- 5) Recording.

Criteria for a good project:

- 1) It should be purposeful
- 2) It should impart gainful learning experiences
- 3) It should cater for the activities of pupils.
- 4) Project must be selected by the active participation of both pupils and the teacher
- 5) Students should get full freedom to work according to their own interests and abilities.
- 6) It must be economical in terms of time and money.
- 7) It should be challenging
- 8) It should be feasible
- 9) It should be time constraints controlled.

As we know project work is group of different tasks. Project work must be assigned as home work. Before assigning the project work as home work, teacher has to give proper instructions and suggestions regarding the project work, i.e. what is role of children, what they have to do? How to do?.

Project work may be given as group work or individual work, based on its nature. If it is a group task, then teacher has to allot the roles and responsibilities of group members. After completion of project work, students have to record it and present it among the classmates. If children face any problem during the project work or in separate writing or in presentation, then teacher has to give proper guidance and support to them. Teacher has to give proper guidance regarding steps in report writing.

For example:

Let us observe project work, in statistics chapter in 10th class mathematics text book. In this chapter the students who are able to find the Arithmetic Mean, they can solve the problem related to their daily life.

Hence we can assign a project to the students, how they are using this concept in this daily life situation.

Organization / Conducting - Project Work:

The following are suggestions for indications for organizing the project work:

- Consider that projects are for achieving specified objectives.

- Projects are assigned to students to complete them within a stipulated time period. So that project assessment skills are also very important.
- Consider that projects are not meant for enhancement of marks.
- Here, completion of project in any way is not important, but the process / method chosen by the student is very important.
- Project report - submission date must be informed priorly.
- If the child doesn't complete the projects within the stipulated time, then teacher has to give suggestions / support or alternatives and make the child to complete the assigned project.
- Every child has to complete / do the assigned project work and submit the project report with his / her own handwriting in a given format.
- One project may be assigned to two or three groups.
- Though 5 marks allotted to project work in 10th class public examinations, as part of formative assessment we have to allot 10 marks for every project work.
- This method must be implemented for 9th & 10th classes. But while recording in register achieved marks / must be recorded for 5 marks only.

Suggested Model of Project Report:

- 1) Name of the Student:
- 2) Class: Medium:
- 3) Roll No:
- 4) Title of the Project
- 5) Introduction:
- 6) Objectives:
- 7) Hypothesis:
- 8) Method:
- 9) Data analysis - tables:
- 10) Interpretation / Problem solving:
- 11) Result:
- 12) Conclusions:
- 13) References:

Weightage of Marks:

While assessing the student's project work, follow the weight age of marks allocation as shown in the below:

- i) Preparation of objectives / procedures / recognizing the sources for data collection / data collection / data analysis / tabulation / Interpretation / recording results – 5 marks.
- ii) Presentation of project report / Oral explanation / submission – 5 marks

Note: If a project work assigned to a group of students, then every student in the group has to write the project report (in his / her own hand writing) and explain it individually. According to the explanation of the student marks must be allotted maximum 5 marks. But, if you want to assess the project for 5 marks (totally), then allot 2 ½ for each above step.

Note to Teacher:

- Teacher has to preserve the project reports submitted by the students as a record of evidence. Keep this project reports available for visiting or inspecting teams at their visits. Based on this records only the visiting teams cross check their marks / grades.
- Teacher ought to help the students in preparation of questionnaire regarding data collection.
- Teacher has to assign the projects, which are having the scope for data collection / experimentation / discovery mode.
- Teacher ought to explain the mathematical concepts which are involved in the project work.
- An this way, according to the nature of the projects, teacher has to assess the work by examining the procedure of the project, and project report and by asking questions regarding the work.

OBSERVATION - INSPECTION:

Formative assessment is part of SSC - Public exams, the marks are consider as internal marks. So that implementation at school level is the responsibility of Head Master. And Divisional Level Dy.E.O. and District level D.E.O. and RTN's will observe. For this implementation moderation committees will be formed and they cross check the records of formative assessment. Hence keep availability of these records at school level.

Model Project - 1

Names of the studnets in the group.

- | | |
|----------------|----------------|
| 1) B. Chandana | 2) T. Karishma |
| 3) U. Naseema | 4) P. Susmitha |
| 5) E. Meri | 6) K. Usha |

Class : 9

Medium : English

Title of the Project : Size of the footwear

Objectives : Finding the mode of the chappal size (footwear size) of 9 & 10 class students in the school.

Hypothesis : Size of the chappals of 9 & 10th class students is 7'.

Method : We T. Chandana, J. Karishma, K. Nasima, formed a group and Smitha, Meri, Usha formed a another group.

- The first group has collected data regarding size of the footwear of 9th class and the second group collected 10th class.
- With the permission of class teacher, we have made table as shown below, based on attendance reports. And sizes of the chappal was recorded against their names.

| Class: 9 th | | |
|------------------------|-------------|------|
| R.No. | Name | Size |
| 1. | A. Vani | |
| 2. | E. Sireesha | |
| | | |
| | | |

| Class: 10 th | | |
|-------------------------|-------------|------|
| R.No. | Name | Size |
| 1. | S. Venkamma | |
| 2. | A. Soni | |
| | | |
| | | |

- By taking maximum and minimum values of sizes, frequency table have been prepared.
- Data was analyzed, the mode of the size was found, and bar graph was drawn for this data.

Class: 9th

| R.No. | Name | Size | R.No. | Name | Size |
|-------|-----------------|------|-------|---------------|------|
| 1. | A. Vani | 7 | 11. | Y. Bhavani | 7 |
| 2. | E. Sireesha | 6 | 12. | T. Sumanjali | 6 |
| 3. | K. Srividya | 7 | 13. | I. Sandhya | 6 |
| 4. | Ch. Nagalakshmi | 5 | 14. | P. Srivani | 6 |
| 5. | A. Sireesha | 6 | 15. | Y.V. Subbamma | 6 |
| 6. | U. Krishnaveni | 6 | 16. | V. Ratnamma | 7 |
| 7. | K. Subhashini | 6 | 17. | R. Vanaja | 7 |
| 8. | G. Madhavi | 6 | 18. | J. Santhi | 6 |
| 9. | T. Mounika | 7 | 19. | T. Eswaramma | 6 |
| 10. | S. Varalakshmi | 6 | 20. | Y. Gayatri | 6 |

| R.No. | Name | Size | R.No. | Name | Size |
|-------|-------------------|------|-------|--------------|------|
| 21. | T. Pushpa | 6 | 33. | N. Revathi | 6 |
| 22. | T. Maheswari | 5 | 34. | S. Vijitha | 9 |
| 23. | B. Venkatalakshmi | 6 | 35. | K. Swathi | 7 |
| 24. | M. Nasheema | 6 | 36. | D. Revathi | 7 |
| 25. | U. Seshamma | 6 | 37. | M. Madhavi | 9 |
| 26. | I. Aruna | 6 | 38. | K. Kalyani | 8 |
| 27. | G. Swapna | 7 | 39. | S. Mamatha | 8 |
| 28. | P. Sharada | 6 | 40. | A. Rajani | 6 |
| 29. | N. Kavitha | 6 | 41. | P. Bharathi | 5 |
| 30. | M. Usha Rani | 8 | 42. | B. Bhavani | 6 |
| 31. | T. Niroopa | 6 | 43. | A.C. Lakshmi | 6 |
| 32. | K. Malleswari | 6 | 44. | M. Vasantha | 6 |

Class: 10th

| R.No. | Name | Size | R.No. | Name | Size |
|-------|----------------|------|-------|----------------|------|
| 1. | S. Venkamma | 5 | 21. | T. Deepthi | 7 |
| 2. | A. Soni | 8 | 22. | T. Rajani | 6 |
| 3. | I. Kavitha | 8 | 23. | P. Alekhya | 7 |
| 4. | M. Mahathi | 6 | 24. | T. Hemalatha | 5 |
| 5. | Ch. Subhashini | 6 | 25. | N. Meri | 7 |
| 6. | I. Vijaya | 6 | 26. | Ch. Aparna | 7 |
| 7. | Ch. Radha | 7 | 27. | P. Ramulamma | 6 |
| 8. | I. Sumpoorna | 6 | 28. | D. Aneela | 5 |
| 9. | Ch. Sunitha | 5 | 29. | B. Soundarya | 6 |
| 10. | B. Mamatha | 8 | 30. | P. Kumari | 7 |
| 11. | K.C. Lakshmi | 6 | 31. | V. Revathi | 5 |
| 12. | Y. Lokeswari | 6 | 32. | Ch. Muneeswari | 8 |
| 13. | Ch. Bhavani | 6 | 33. | T.V. Lakshmi | 5 |
| 14. | K. Aruna | 7 | 34. | E. Chenchamma | 6 |
| 15. | G. Shilpa | 7 | 35. | M. Sravani | 6 |
| 16. | Ch. Mounika | 9 | 36. | I. Keerthi | 7 |
| 17. | P. Sujana | 6 | 37. | M. Saranya | 6 |
| 18. | D. Sunandana | 7 | 38. | Ch. Kalpana | 8 |
| 19. | M.V. Kumari | 6 | 39. | D. Anjamma | 5 |
| 20. | Y. Vasantha | 8 | 40. | Ch. Subbamma | 8 |

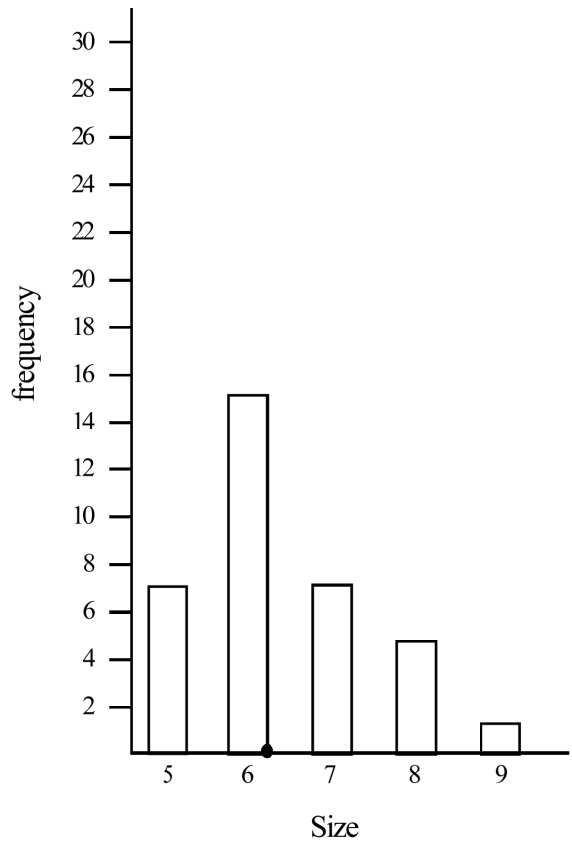
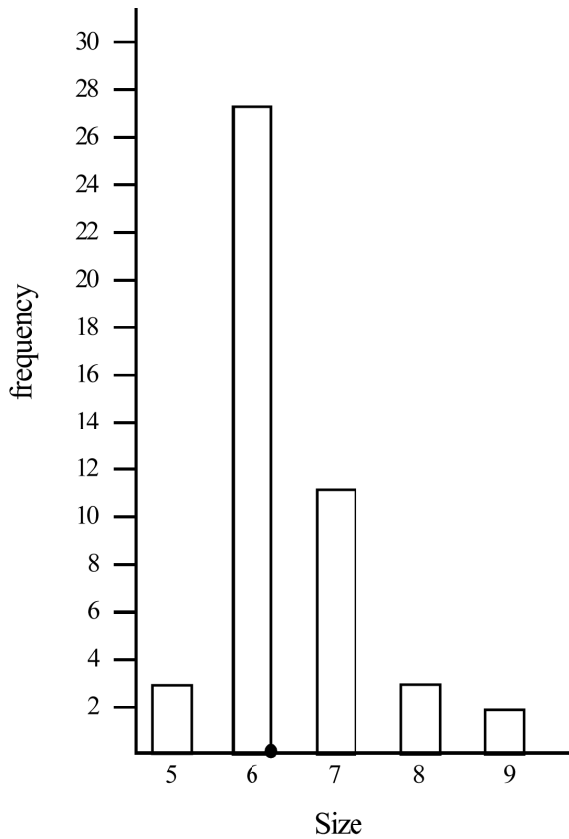
(ii) Frequency table

| Class: 9 th | | | Class: 10 th | | |
|------------------------|-------------|----------------|-------------------------|-------------|----------------|
| Size | Tally marks | fre- quency | Size | Tally marks | fre- quency |
| 5 | | 3 | 5 | | 7 |
| 6 | | 27 | 6 | | 15 |
| 7 | | 9 | 7 | | 10 |
| 8 | | 3 | 8 | | 7 |
| 9 | | 2 | 9 | | 1 |

(iii) Finding mode:

| Class: 9 th | | Class: 10 th | |
|------------------------|------------------|-------------------------|------------------|
| Size (x) | frequency (f) | Size (x) | frequency (f) |
| 5 | 3 | 5 | 7 |
| 6 | 27 | 6 | 15 |
| 7 | 9 | 7 | 10 |
| 8 | 3 | 8 | 7 |
| 9 | 2 | 9 | 1 |

(iv) Bar Graphs:



Result: The size of the foot ware of 9th & 10th class students is = 6.

Conclusion: _____

Reference: 10th class maths text book (SCERT)

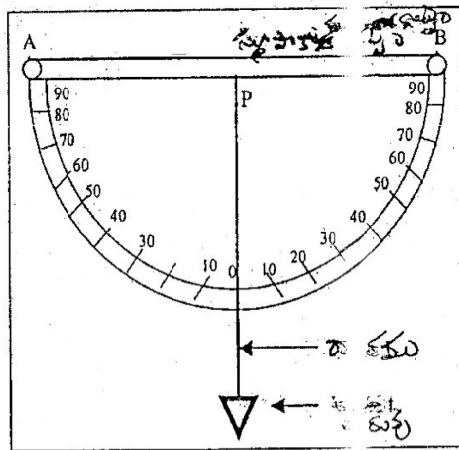
MODEL PROJECT – 2

I Preliminaries:

- Names of the students :
- 1) K. Raju – Class: X, R.No.15
 - 2) R. Akhila – Class: X, R.No.17
 - 3) Sreedhar – Class: X, R.No.20
 - 4) Veena – Class: X, R.No.25
 - 5) Urmila – Class: X, R.No.30

- Title of the project : Finding Heights – Distances:
- Objectives : To find the height of a tree without climbing it
- Hypothesis : Height of the tree ____ mtrs.
- Required material : A hallow cylindrical long pipe, a plastic card board, sheet cut in semi-circle, thread and a weight.

Figure:



Method: This project is carried out based on practical / experimental method

Step-I (Construction of Instruments)

Take a cylindrical tube AB. Fig.1 fix the semicircle shaped card board as shown. Fix one end of the thread at the midpoint 'O' and weight to the other end of the thread. Angles are marked on the semicircular card board from 0° – 90° on both sides as shown in the figure. Now, with this apparatus we can find the angle of elevation.

Step-II (Using the apparatus – and finding the angle of elevation practically)

First the distant object T is focused (i.e.: the top of the tree is focused) through the focus pipe. The thread shows an angle when we focus on the protractor. The values of this angle of elevation must be noted in a given proforma. Repeat this 2 or 3 times

Figure-2:

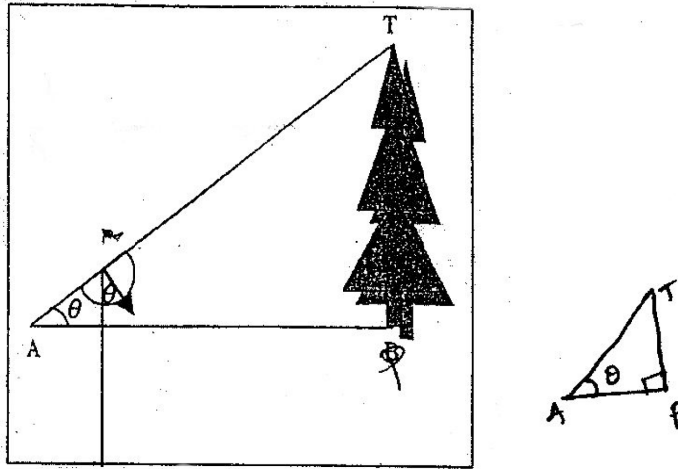


Table-1:

Showing the value of angles of elevation, perpendicular distance

| Sl. No. | Angle of elevation (θ) | Perpendicular distance between observer and tree (m) |
|---------|---------------------------------|--|
| 1 | | |
| 2 | | |
| 3 | | |

Data Analysis:

By using the angle (θ), and distance (m) we can find the height of the tree, using trigonometric ratios as follows:

$$\tan \theta = \frac{PT}{AT} = \frac{\text{Height of the tree}}{\text{Perpendicular distance}}$$

\therefore Height of the tree = Distance X Tan θ .

(we will find the height of the tree, by substituting the θ value from tangent values).

Table-2:

| Sl. No. | Angle (θ) | Tan (θ) = | Perpendicular distance (d) m | Height of the tree = (d X Tan θ) |
|---------|--------------------|--------------------|------------------------------|---|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |

Observation : By observing the above values, the height of the tree = _____

Result : Height of the (target) tree = _____ m.

Conclusion : Thus, we can find the heights and distances by the help of such an apparatus called clinometers and using the trigonometric principles. If we know the height we can find the distance between target and observation point and viceverse. This method very useful in finding the width of rivers etc. And these applications are useful in Civil engineering, etc.

References :

- 1) Maths cas kit, NCERT
- 2) 10th class text book NCERT
- 3) Methods of Teaching mathematics - Telugu Academy

MODEL PROJECTS / SUGGESTED PROJECT PROBLEMS – 3

Chapter wise suggestive project problems are given below. These problems may be assigned under projects within the formative assessment period. In formative assessment, project from each chapter may be assigned to the groups.

- Teachers can identify new problems from each chapter based on the nature of concepts and assign project work to the children on their own. But at first teacher should have the concrete comprehension on the topic / project and then give proper guidance to the children. Make the each children should participate in it. For model project reporting two projects are discussed in this module.

Now, let us observe the topics / problems for project, chapter wise:

1. Read Numbers :

- Collect the (H^+) ions concentration of different solutions like: Citric acid, blood, water, $CO(OH)_2$, Soap etc. (using text book / logarithmic principle find the pH).
- Collect the 5 models from grills preparing shop (welding point), in this context find the use of irrational numbers.
- Find the 10 irrational numbers and $\frac{3}{4}$ - rational numbers in between $\sqrt{2}$ and $\sqrt{3}$ etc.

2. Sets :

- Collect the data from your school mates, which game do they play. And explain it by a figure (we diagram)
- Collect the data from your locality, that viewers of $\frac{3}{4}$ - T.V. channels.

3. Polynomials :

- Representation different polynomials on graphs connecting with daily life situation.

4. Pair of linear equations in two variables :

- Based on the problem in Ex.4.1, create a new problem connection seal life situation and solve it.

5. Quadratic Equations :

- Factorization of quadratic expressions - using geometrical concepts carea of square of rectangle.

6. Progressions :

- Find the number of bricks to build a pyramid.

7. Co-ordinate geometry :

- Using co-ordinate geometry, prove the geometrical concepts like area of triangle, collinear point, etc.

8. Similar Triangles :

- Testing the thermos practically.
- Find the height of a tree / tangent, using the concept of similar triangles.
- Prove the Pythagoras theory, using different methods / figures.

9. Mensuration :

- Find the surface area and volume of different five 3D - objects in your locality (Ex: Shape of a building, expenditure estimation for white wash etc.)

10. Trigonometry & (11) Applications of Trigonometry :

- Find the values of trigonometric ratios (for 0° , 30° , 45° , 60° , 90°) by using graph paper, scale, etc.
- Find the height / distance of a given objects / targets, using elinometer.

11. Probability :

- Find the difference between theoretical probability and experimental probability, with an experiment.
- If you cut a wooden stick at two points, make it into 3 points, then what is the probability of maeing a triangle with that pieces.

12. Statistics :

- Suggested projects in text book,
- Collection data regarding literacy, in a locality / marks in SSC / results / and drawing frequency curve to that data, and interpretation.

Formative Assessment - Recording Process:

There is no need to conduct all the tools (i.e.: Slip test, written work, project work, crating new problems) at a time or on one day. By observing daily work and student's responses we can assess the progress. We have to award marks and grades. Marks and grades are awarded to each tool in formative assessment. Observe the following table.

| Sl. No. | Name of the student | Creating new mathematics problems | Written work | Project works | Slip test | Total marks |
|---------|---------------------|-----------------------------------|--------------|---------------|-----------|-------------|
| 1 | | | | | | |
| 2 | | | | | | |

Marks should be allotted to each tool as shown below.

Creating / making new problems :

- For creating / making new problems on different concepts in each unit (2 ½ marks)
- For presentation of such created problem in the class room (2 ½ marks)
- These problems must be written (recorded) by the children in their F.A. Note Book

Written Works :

For solving the problems under different titles i.e.: do this, try this, think and discuss and exercise problems or any other problems posed by the teacher, students have to write (solve) in class work or home work note book. These class work and home work note books must be corrected by the teacher. And teacher has to observe that how the children are thinking and in what way they are solving the problems, based on that assess their progress and award (05) marks for it.

Project Work :

Project work (which is assigned by the teach) report prepared by children, individually must be written in the F.A. Note Book. If children write the report perfectly, then award (2 ½) marks maximum.

For presentation of project work in the class room by individual student, (based on their presentation process / skills) award 2 ½ marks maximum.

Slip Test :

Writing 3 or 4 problems on the black board, and let the children to solve such problems instantaneously in their F.A. note book. Based on their problem solving process, award maximum 5 marks only.

How many F.A.s? When?

In one academic year, we have to conduct four formative assessments for this observe the below table:

| F.A. | Month of conducting |
|--------|---------------------|
| F.A.-1 | July |
| F.A.-2 | September |
| F.A.-3 | November |
| F.A.-4 | February |