Final Draft

COGNITIVE ATTAINMENT :
A GLIMPSE OF PROCESS

(BASE LINE - 1995)

Rese archers

Rekha Sharma, Preeti Sharma, Archana Anand, Manorama Sharma, Avlokita Singh, Laxmi Jain, Neelu Jain, Hemlata, Vishambher, Cheetarmal, Sushma Sharma, Kishore, Geetanjali

Facilitation and Training

Hitendra Upadhay, Sushmita Banerjee

Consultants

Dr. Poonam Batra, Prof. Nargis Panchapkesan

Co-ordinator

Sushmita Banerjee

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I. INTRODUCTION

In accordance with the constructivist[1] view of learning children have a natural tendency to 'make sense' of the 'world' around them. Built in this vies is the understanding and assertion that children's learning is a process of knowledge construction and knowledge generation. In an attempt to create a meaningful and consistent representation of knowledge children also try to lame sense of new information by linking it with previous knowledge in meaningful ways. However, conventional education continues to view learning as the acquisition of given knowledge. The 'traditional' curriculum and classroom, typical of most schools, while focusing on information based knowledge by promote 'intellectual development' through text books learning and memorization. In this view, it is believed that the best indicators of learning are 'completely ignores the 'process' by which children think and learn thus reducing all children's assessment to merely the 'product' of learning. In keeping with this paradigm, educational research has largely focused on assessing children's achievement levels in formal school subjects such as language and maths. Even evaluation/impact studies within this paradigm have had a similar focus.

What follows then is a lack of distinction between 'cognitive attainment' and 'scholastic achievement.' Cognitive attainment's in our understanding refers to children's capacities to solve problems, create, make sense and construct. This process necessarily includes emotions and attitudes that children bring with them to any learning situation. 'Scholastic achievement' on the other hand refers to levels of accomplishment in specific areas of gives school knowledge. It is ovr vies that any attempt to understand and assess children's cognitive attainment necessarily demands the following :

(a) A focus on assessing children's children's capacities to make sense, create and solve problems rather than ascertaining children's levels of achievement in school subjects.

(b) A focus on 'process' along with 'product' of learning.

This is especially important within the constructivist framework of which the most recent perspective emerges from Vygotskian ideas[2] wherein cognitive and affective processes operate within the context of shared learning. Moreover, assessment studies that focus only on product fail to provide any real insight into the nature of children's thinking particularly those aspects of cognition which are likely to by influenced by and innovative intervention.

An 'innovative' curriculum in contrast to the traditional uses and activity based method that is likely to promote individual creativity and self-learning. The reference point for evaluation is the child herself. The teacher facilitates imagination, ability to question, think, learn and create while building on children's knowledge. This is likely to enhance cognitive capacities and promote a sense of self confidence in children.

The Bodh programme emphasizes learning through direct experience which simultaneously relates to the experiential knowledge children already prossess[3]. Children's understanding forms the starting point of the teaching- learning process which also aims to further this understanding. With the child at the centre the thrust of the Bodh curriculum is to develop 'rational' and 'democratic' values in children while encouraging creative learning and developing competency in language and other school subjects. Teachers play an important role in developing the Bodh innovative program. The training offered by Bodh provides teachers with the freedom to explore creative methods in teaching that are child-sensitive and child-centered. This perception has evolved from the organization's rich experience of working in schools among different communities in Jaipur and specifically with more vulnerable sections in the city. Bosh' perspective is reflected both in pedagogical inputs in education as well as in their holistic understanding of children and learning.

The Study

The present study is an attempt to assess children's cognitive attainment with a specific focus on the process. The study emphasizes that it is as important to systematically capture the cognitive 'process' as it is to assess the cognitive 'attainment' of children. It is an attempt to assess children's cognitive capacities in a manner that gives insight into their thinking and learning strategies. It is therefore based on the premise that such a focus demands a methodological approach that is essentially 'dynamic' in nature. Underpinning all dynamic assessment[4] processes in the notion of the assessor who provides support and guidance in task completion (discussed in detail in the following section).

Objective

The main objective of the study is to establish a baseline of cognitive attainment of children in a sample of primary classrooms where the innovative Bodh curriculum is to be implemented. The study explores the processes of children's thinking and learning while assessing cognitive attainment through problem solving in language, arithmetic and thinking tasks.

II. METHODOLOGY

The intervention programme of Bodh began in 1994 in ten selected state run elementary schools of the Rajasthan Government in Jaipur. The chosen schools are rerpesentative of the varied communities whose schooling needs are being met by Bodh.

The study focussed on Class II in accordance with the objective of establishing a baseline against which the impact of Bodh intervention can be subsequently studied. Hence it was considered appropriate to establish near the beginning of primary schooling.

Using the method of stratified and purposive sampling, 97 children (41 boys and 56 girls) were selected from among each of the ten schools adopted by Bodh. The sample strength forms 20 percent of the total number of children in Class II of the ten schools. The study started its investigation in 1995, just prior to Bodh's intervention in Class II.

The distribution of the sample selected for investigation is given in the table (1.0) below:

TABLE 1.0 : SAMPLE DISTRIBUTION

S.No.	Schools	Boys	Girls	Total
1.	Gher Saiwad	8	6	10
2.	Jawahar Nagar	1	0	01
3.	Bajaj Nagar	3	7	10
4.	Jhotwada	2	6	08
5.	Koti Kolyan	5	5	10
6.	MREC	6	6	12
7.	NVD	5	6	11
8.	Nahri ka Naka	6	6	12
9.	Paharganj	4	6	10
10.	Shopur	1	8	09
	Total	**41**	**56**	**97**

Methodology : The perspective

The specific objective of the study was to explore both 'process' and levels of children's cognitive attainment. The study began with the understanding that for an effective and meaningful assessment of cognitive process and product it is essential to move beyond the testing of scholastic of achievement levels in school subjects. This placed demands for alternative assessment procedures. Research has distinguished between traditional 'static measures' that assess the individual's capacity to produce a successul end product (such as

through achievement tests) and 'dynamic assessment' that provide insight into the nature of children's thinking and in particular cognitive processes.

The idea of dynamic assessment[5] flows out of the Vygotskian ideas on how children think, learn and develop. Vygotsky distinguishes between what children can do on their own and what they can do with the support and guidance of a more knowledgeable adult. This in Vygotskian theory is referred to as the child's zone of proximal development[16]. He argues that the child not only learns and internalises lessons about specific tasks when she cooperates with more knowledgeable others, she also discovers how to plan and organise her own cognitive activity. The support offered to the child through this social interaction has been called 'scaffolding',[7] a pedagogic principle of unique significance in a Vygotskian classroom.

Underpinning all dynamic assessment processes is the notion of the assessor who works alongside the Child. Coparticipation or support may by offered in many forms for example, by giving cues of by asking leading questions. Dynamic assessment besides being effectively diagnostic in nature also provides a framework for attending to the 'non-intellectual' factors which in our view are an integral part of how children learn and develop[8]. Drawing upon the approach of dynamic assessment, the study began with the premise that testing must be sees as a continuation of learning. We thus began with the understanding that support and guidance offered by the investigator in task completion would help achieve the objective of gaining insight into childrens thinking and learning processes.

Two specific features of the methodology adopted in this study are:

a. 'aiding' the child in task completion to provide maximal space for each child's individual response to the given tasks. It must be noted that in traditional measures of assessment such support in task completion would amount to 'unscientific enquiry'.

b. evidence for drawing inferences about children's processes of thinking and learning is obtained during the assessment procedure.

Tools

Three tools were designed in the areas of language, arithmetic and thinking (Appendix-A). Language and arithmetic were chosen areas as these are significant concerns of primary schooling. Thinking tasks helped to move beyond school subjects and provide problem solving activities that could tap children's natural tendencies to 'make sense'. Tasks in all three areas were designed to pose problems for children to solve than evoke responses of recall and memorised information. In this sense, the tasks were designed to capture children's cognitive processes as well as attainment levels.

The sources drawn upon for designing the tasks are : language curriculum materials of Digantar, Zakia Kurrien's handbook of acitivities, Russian picture stories and an abridged version of an NBT children's story.

The tasks were administered individualy. Detailed written instructions for testing and observing and recording responses were provided to the researchers. This formed a part of an intensive orientation and training of the researchers. The total testing time was about one and a half hours per child spread over two sessions. However no time limit was imposed on the children for any of the tasks.]

Task Description : Table 1.1 given below gives details of details of each task including the observation and recording procedure in each of the three areas. Appendix-B represents the scoring method followed for each task.

TABLE 1.1 : TASK DESCRIPTION AND CONDUCTION

S.No.	Task	Records and Observations of the Investigator
1.	**Reading a story** • how children read: • comprehension-4 questions:	• strategy in reading • verbatim record of children's respones
2.	**Listening to a story** • comprehension-4 questions:	• verbatim record of children's responses
3.	**Writing about a picture** • writing 4 sentences :	• children's written responses • verbatim record of children's story narration
4	Narrating a story	• children's responses • whether help was required, if so nature of help.
	Thinking Tasks	• children's responses • whether help was required; if so nature of help • strategy employed in solving the problem
1a	Constructing squares with matchsticks	• patterns drawn by children • comments by children, if any
1b	Problem solving	• children's responses
2a	Extending a given pattern	• strategy employed in joining parts
2b	Completing a series	• number of parts joined correctly and which parts

S.No.	Task	Records and Observations of the Investigator
3	Jigsaw Puzzle	• parts not joined/joined incorrectly
4a	Spot the differences	• record of differences identified by child
4b	Spot he animals	• number of animals identified
5	Odd one out	• picture identified as the odd one • reasoning for response given
6	Sequence picture cards to complete a story	• placement sequence • verbatim record of clients story narration
	Arithmetic Tasks	
1a	Sequencing numerals	• sequence generated • strategy of sequencing
1b	Numeraler recognition	• children's responses
2a	Grouping (40 items) 3 questions :	• children's responses while grouping • strategies employed to group • responces to the questions
2b	Grouping (28 items) 3 questions:	• children's responses while grouping • strategies employed • responces to the questions
3a	Word Problem (addition and subtraction) 3 questions :	• children's responses to the questions • strategy employed in each case
3b	Word Problem (multiplication)	• children's responses • strategy employed
4	Formal arithmetic 4 questions :	• written record of children's solutions • strategy employed • use of place value
Please note that Task 4 of the language tasks and 6 of the thinking tasks was conducted as one task wherein children were first asked to sequence the picture cards and then narrate the story created by them.		

III. RESULTS

Children's performance on each of the three areas of language, thinking and arithmetic tasks is presented in this section. Children's performance on language tasks is presented first, followed by thinking and arithmetic. In each case data has been tabulated to present a clear picture of the cognitive attainment levels of children and the processes they following in terms of arriving at solutions to given tasks. The process of recording each child's response included the recording of errors. Data obtained does not permit a quantitative analysis of children's errors. However, using qualitative analysis an attempt has been made to understand the errors children make in the context of their cognitive processes and attainment levels.

Language Tasks

TABLE 2.0A : STRATEGIES OF READING N=97

Strategy of reading	Percentage
reading fluently	22
अक्षर जोड़–जोड़ कर पढ़ना	02
मात्राओं में गलती करना	47
recognizing only alphabets	05
cannot read	24
Source : **Task 1 : Reading a stoy**	

Table 2.0A presents the reading strategies children use to read a given text while Table 2.0B indicates Children's attainment levels for reading comprehension. The results are disappointing. Only 22% children are observed to read fluently, and a substantial number of 24% cannot read at all. Most (47%) children read hesitatingly, making frequent errors in the production of vowel sound. Few others can either recognise only individual alphabetic letters or make desperate attempts to join relate to children's inability to use vowel sounds appropriately. For instance, children were inclined to read खेलते as खोलते, नदि as नद, such errors indicate that children do not seem to be reading for meaning. It is evident that in this case, the strategy of 'decoding' words instead of 'reading for meaning' leads to poor comprehension of the text. Other errors include leaving out words which children find difficult to decode and not taking into account punctuation marks while reading. Few children who were clearly reading for meaning, replaced words of the text with those which form part of their everyday vocabulary, for example, repalcing मजे with मौज or जामुन with गुलाबजामुन.

Data on children's strategy of reading is also indicative of the method followed in teaching children to read. Most children are observed struggling to 'decode' words by joining letters

and vowel sounds. Reading for meaning does not appear to be a central part of the reading process during curriculum transaction. This is also reflected in the analysis of children's comprehension of the questions asked on the text.

TABLE 2.0B : READING COMPREHENSION N=97

Number of Questions answered correctly	Percentage
four	33
three	22
two	11
one	01
none	33
Source : **Task 1 : Reading a story**	

Questions designed to assess children's reading comprehension demanded the processing of information from within the text. As many as 33% children could not answer even one question correctly. These are the children who either cannot read meaningfully or cannot even decode. About half (55%) of the children were able to answer three or more questions correctly. Of these 96% are either able to read fluently or attempt to read using the strategy of decoding.

TABLE 2.1 : WRITTEN EXPRESSION N= 97

Rating on sentence construction, meaningful sentences and correctness in speelling	Percentage
6.5-8.0	12
4.5-6.5	27
0.5-4.5	25
0.0-0.5	36
Source : **Task 2 : Writing about a picture**	

As many as one third of the children received a rating of less than 0.5 on an eight point scale for the task on Written Expression (Table 2.1). The performance of only 12% children was rated as adequate on the writing task. Children's poor performance on this task became very apparent in the qualitative error analysis. While several children were able to articulate verbally about the picture, they were unable to write meaningful sentences about it. The errors observed were: some children wrote only a set of disparate words (eg. चिड़िया, लड़की, हाथी, खरगोश), some words were also unintelligible (eg. कलेस सकस), and few chldren wrote only the first letter of a word (eg. ग for गाय, त for तितली) Some who could

write meaningful sentences wrote without distinguishing clearly between individual words (खारहा) and sentences (गाय पर कपड़े सूक रहे थे एक लड़का पेड़ पर जूल रहा था गीलेरी का हात पकड़ कर जूल रही थी). A common error in sentence construction consisted of children translating phonetically from the spoken to the written such as निलारा for 'नहला रहा है', खारा for 'खरा रहा है' and मुमे for 'मुँह में'. Spelling errors also reflected the inability to use vowel sounds (eg. लड़क) and direct translation from the spoken to the written (for eg. हाती for हाथी and जूला for झूला). It is important to note that despite errors in spelling and/or sentence construction children's written expression does convey meaning. This has been kept in mind while assigning them a rating score.

TABLE 2.2 : LISTENING COMPREHENSION N=97

Number of questions answered correctly	Percentage
four	37
three	33
two	22
one	07
none	01
Source : **Task 3 : Listening to a story**	

Table 2.2 presents children's performance on Task 3 : Listening to a story. Questions asked were directly from the text that was read out. Children fared quite well on this task. 70% were able to answer 3 to 4 questions correctly. It is important to note that only 1 % children were unable to answer any question. This is to be contrasted to the results obtained for the task on reading comprehension where 33% of the children could not answer even one question correctly. It is not surprising that children perform well on an oral language task - que which is closest to their cultural context and forms part of their 'everyday learning'.

It is also important to note that in traditional educational practice listening comprehension does not form an important part of the language curriculum. The thrust is on reading and writing. Children's comparatively better performance on this task indicates the tremendous potential that can be tapped in: a classroom to teach the formal skills of reading and writing. In this case it is evident that children's natural capacity to comprehend and communicate spoken language is not recognised asbuilding blocks for developing skills in written language.

An examination of children's errors revealed that some responses although incorrect from the view of an expectation of precision, nevertheless reflect a sound comprehension of the ideas contained in the text. Some of the 'wrong' answers to question no. 3 (see Appendix A(i) for example, are logically correct given the text but lack the precision required on a task of reading comprehension. (e.g tc खरगोश पौधों के पत्ते खाने के लिए आगे बढ़ा तो मुनिया ने

क्या किया? correct precise response: चिल्लाया. erroneous but textrially logical response : दीवार बनाया)

TABLE 2.3 : ARTICULATION N=97

Rating on fluency, grammatical construction and logical sequence	Percentage
four	08
three	18
two	31
one	34
zero	09
Source : Task 4 : Narrating story.	

A significant number of children fall in the average range when rated on fluency, logical sequence and correctness of language in their spoken expression. (Table 2.3) A small number (8%) articulated satisfactorily and an equally small number (9%) could not articulate at all. As many as 34% obtained a very low rating on fluency, grammatical construction and logical flow in spoken expression. It is evident that the 'traditional' curriculum provides no opportunity or space for children to express themselves in spoken language. The fact that these children are found to be far better at understanding spoken Hindi rather than articulating in it, indicates two possibilities: (a) a gap between home and school language and (b) the far greater opportunity to hear spoken Hindi in a teacher-centered classroom.

'Errors' reflect the use of dialect both in terms of vocabulary and sentence construction. For instance, children used the dialect word उन्दरे for चूहा. Children expressed बहुत सारे as brus सारे or भाग या as भग गया Such responses have not been rated zero. However they have also not been rated very high. It thus appears that children are performing poorly on those tasks which are heavily dependent on classroom opportunities and instruction i.e. reading comprehension, writing and articulation.

Conclusions

- Most children do not read for meaning but merely to decode the text. Decoding thus leads to a lack of fluency in reading and frequent errors in the production of vowel sounds. This is likely to create a is interest in reading as an activity.
- Written expression demonstrates an unfamiliarity with writing as an activity and the nature of written language. The basic essentials of sentence construction and punctuation marks are alien to most children. Even an extremely stimulating picture failed to evoke meaningful ideas that connected to form a whole. Children's writing often included discrete words or unclear sentences with frequent spelling errors.

- Listening comprehension was found to be an interesting, familiar and engrossing task. Children were able to relate to the story narrated and were actively engaged in answering questions asked. Typically lass room activity focuses only on reading and writing, that too in alien contexts. Listening activities seem to be a powerful method of building upon children's knowledge of spoken language and enhancing multiple cognitive capacities through the oral mode.
- Children have largely performed poorly on the task of articulation. Considerable use of dialect words and expression along with a lack of fluency in thought and logic was predominant. It is not surprising that children who are yet not comfortable with standard Hindi in spoken form are also unable to read fluently. It is evident that a gap between the home and school language is further enhanced when classroom activity disallows children from expressing themselves verbally and inhibits their spontaneous need to interact and communicate. Such prohibiting practices suppress the development of language proficiency (spoken and in turn written) by way of reinforcing feelings of inferiority, poor self-concept and a feeling of shame for one's our dialect/language. Poor performance on language tasks have significant implications for the language curriculum for primary classes such as : role of dialect in a classroom, role of oral articulation and listening exercises and its relationship with reading and writing.

Thinking Tasks

TABLE 3.0 : LINEAR REASONING N=97

Response	Percentage
task completed without help	77
task completed with help	12
unable to complete successfully	10
Source : **Task Ia : Constructing squares with match sticks**	

Tables 3.0 to 3.7 present children's performance on thinking tasks. From the above table it is seen that children performed very well on the linear reasoning task. Almost 90% children could complete the task. Some children (12%) needed help from the researcher in the form of a little prompting. Only 10% children could not finish the task successfully. Incomplete responses consisted of either one triangle and one square (□Δ) or one square and one incomplete square (□[). This finding is important because tasks such as these do not usually form part of the formal school curriculum. Children thus demonstrate the capacity to think and construct their own solutions to a given problem. It is also evident that such a task does not demand a capacity to deal with formal school knowledge. Given the task, children are provided with the opportunity to think and create solutions, for which many have demonstrated a remarkable capacity (77%).

TABLE 3.1A : NONLINEAR REASONING N=97

Response	Percentage
task completed without help	71
task completed with help	09
unable to complete successfully	20
Source : **Task 1b : Problem Solving**	

TABLE 3.1B : STRATEGIES OF SOLVING THE PROBLEM N=75

Strategy	Percentage
measure after emptying jug	93
measure initially	07
Source : **Task 1b : Problem Solving**	

According to Table 3.1A, children also did quite well on the non-linear reasoning task. 80% children were able to complete the task. Of the 20% children who were unable to solve the problem successfully, some tended to respond by repeating the question in the form of a statement. Others did not know what to do. One child insisted that the neighbor would get her own jug, thus absolving herself of solving the problem. Of those who attempted to solve the problem, 93% used the more efficient strategy of emptying the jug first. This is another example of a task that provides an opportunity for children to think creatively and solve a problem, quite independent of formal school knowledge.

TABLE 3.2A : PATTERN REPRESENTATION N=97

Response	Percentage
accurate	74
error in orientation	10
orientation ignored	05
inaccurate	10
Source : **Task 2a : Extending a given pattern**	

Table 3.2 A indicate; -. that a large number (74%) of children were able to reproduce the pattern exactly as given to them. 10% children made slight errors in the orientation of the match sticks while 10% were unable to reproduce the given pattern.

TABLE 3.2B : PATTERN COMPLETION N=97

Response	Percentage Item Scores
accurate	66
inaccurate	34
Source : **Task 2b : Completing a series (Pencil)**	

TABLE 3.2C : PATTERN COMPLETION N=97

Response	Percentage Item Scores
accurate	79
inaccurate	21
Source : **Task 2c : Completing a series (Flower)**	

Two subtasks were given to assess children's logical ability in completing a given series of pattern. (Table 3.2B and Table 3.2C). Most children were able to complete the required series for both the pencil and flower reasoning tasks (66% and 79% respectively). The flower reasoning task was evidently easier than the pencil reasoning task; 89% children of those who solved the pencil task also solved the flower task; whereas only 74% of children who solved the flower task were able to solve the pencil task. Error analysis revealed that some children completed the series inaccurately. They did not point the pencil in the correct direction or place the flower in the right corner. Some errors also showed that perhaps children did not comprehend the task. They either repeated the given pattern or their response was totally unrelated to the given task. It appears that completing the pencil series was more difficult for children .perhaps because of having to cope with two variables at one time, namely orientation and position in space.

TABLE 3.3A : PART WHOLE RELATIONSHIP N=97

Response	Percentage
picture completed	70
partially completed (3-5 parts)	22
partially completed (2 parts)	02
unable to complete successfully	06
Source **: Task 3 : Jigsaw Puzzle**	

TABLE 3.3B : STRATEGIES OF SOLVING THE PUZZLE N=96

Strategy	Percentage
used form of piece and picture as clue	28
used only form of piece as clue	49
used only part of picture as clue	13
used trial and error	10
***Source* : Task 3 : Jigsaw Puzzle**	

Table 3.3 A and 3.3 B indicate the responses of children to the Jigsaw Puzzle task and the strategies used. Results show that 70% children were able to complete the picture by fitting correctly all the six parts of the jigsaw puzzle to solve it. The most frequently used strategy was one in which children primarily considered the form of the piece in order to fit the jigsaw together. Only a quarter (28%) of the children used the more efficient strategy of looking at .both the picture as well as the form of the piece while fitting pieces together. Further analysis revealed no significant relationship between the strategy employed and arriving at the correct solution.

TABLE 3.4 : OBSERVATION AND DISCRIMINATION N=97

Number of differences spotted	Percentage
five'	04
three-four	36
one-two	45
hone	14
***Source :* Task 4a : Spot the differences**	

Table 3.4 presents children's ability to spot differences between two similar pictures. Results show that only a very small percentage (4%) of children could spot all the required differences (5). While 14% children were not able to find any difference between the two pictures presented. 36% were able to identify 3-4 differences and 45% identified 1 to 2 of the 5 differences. Errors reveal that children keenly look for differences which may not even be visual in nature. For instance, one child expressed that one basket weighs more than the other. While children's performance largely indicates a keen sense of observation, it appears that the school curriculum does not necessarily build upon it for instance for language teaching and learning (indicated by their low performance on these tasks).

TABLE 3.5 : OBSERVATION N=97

Number of animals spotted	Percentage
imore than eight	70
seven or eight	09
four-six	20
less than four	01
Source **: Task 4b : Spot the animals**	

Results indicate that children performed well on the observation task requiring them to identify animal figures embedded in the background (Table 3.5). 70% children were able to spot at least eight animals and only 1 % children spotted less than four animals. A comparison of, performance on the observation and observation and discrimination task reveals that children performed considerably better on the observation task. 94% . children who spotted all eight animals were also able to identify all five differences in the observation and discrimination task. Children who discerned all five differences on the discrimination task were able to spot more than 8 animals on the observation task.

TABLE 3.6 : CLASSIFICATION N=96

Response	Percentage
correct with clear reason	27
correct with inadequate reason	45
incorrect	28
Source : **Task 5 : Odd one out**	

Table 3.6 presents children's performance on the classification task. As shown in the table, 72% children gave the correct answer. 27% children substantiated their correct response with clear reasoning, while 45% could not give an adequate reason for their response. For example, while some children were able to identity as the odd one out, their reasoning at best referred to the specific characteristics of the animal rather than in comparison to the other items. Often the reasoning given was a mere expression .of the description of the individual pictures. 28% children could not solve the "task. Incorrect responses indicated the inability of children to comprehend the task itself. It is probable that a task such as this comes closer to the demands of formal schooling. Most formal school knowledge demands children to have the basic skill to classify in order to conceptualize knowledge and/ or process information. It is therefore not surprising that only a quarter of the children could articulate a logical reason for their response. It is evident that the school experience as it exists does not necessarily promote the development of such logical reasoning capacities.

TABLE 3.7 : LOGICAL REASONING N= 95

Response	Percentage
sequenced logically	23
disjointedly sequenced	77
Source : Task 6 : Sequencing picture cards to complete a story	

Results in Table 3.7, indicate that most children (77%) were unable to solve the logical reasoning task. Children were not able to place all the cards in the expected sequence. It seems that tasks that demands the capacity to reason in accordance with formal logic is unfamiliar to these children. Although such tasks should form a 'natural' part of the school curriculum, children's performance reflects poorly on their capacities to cope with formal learning. While some children demonstrate their own logical thinking while reconstructing a story with the given cards, most were observed to have failed to use expected formal logical reasoning in solving that task. It is important to mention here that while scoring of children's constructed sequences, the interchange of certain cards was not considered wrong. Children could replace cards E and F with each other and cards A, B and C with each other without losing any marks. Such innovative rearrangements were considered logical because they did not interfere with the basic logical weave of the story. Data contains many examples of children paling cards in a rearranged sequence, thus reconstructing the story. Infect, such attempts at reconstruction have a consistent logic of their own and reflect the creative mind of the child as evident in the given examples: One child rearranged the cards and narrated the following story:

> पहले बिल्ली चूहे को पकड़ने लगी तो फिर हाथ से निकालने लगी। चूही बोतल में घुस गया। चूहे आए उसे निकालने लगे और उसे निकालकर ले गये।

Another child also rearranged the cards and narrated the following story.

> एक बिल्ली थी और एक बोतल और बोतल के अन्दर था चूहा। बिल्ली को बहुत चूहे भाते थे बहुत अच्छे लगते थे। बोतल देखी उसे भूख लग रही थी किताब बोतल के पास रखी थीं तो बिल्ली बोली ''मैं इसे निकालूं कैसे?'' मुँह इधर कर लिया फिर बोतल में हाथ डाला फिर भी नहीं निकला फिर एकदम से बिल्ली ऊपर चढ़ी तो बोतल गिर गई। चूहा आधा बाहर निकल आया आधा अन्दर रह गया। फिर वापिस अन्दर चला गया। फिर चूहे की माँ आई तो बोतल को वापस खड़ा किया उसी जगह पर रखा। चूहा सभी हाल बताया कि बिल्ली आई थी मुझे खाने के लिए। फिर चूहिया बोली, ''हर जाओ अभी निकालती हूँ''। फिर बड़ी चूही नीचे रही फिर उसके ऊपर एक और फिर उसके ऊपर एक और चूहा चढ़ गया फिर अपनी पूंछ के रस्सी बांध के चूहे को पकड़ाया फिर उसे खींच लिया उसे बाहर निकाल दिया फिर एक–एक करके सब उतर गये फिर बोतल खाली हो गयी फिर चारों चूहे दौड़ गये एक चूहे की माँ और तीन चूहे चारों साथ–साथ चले गये।

Most such stories were also found to be rich in ideas and detail. However, the finding that most children (77%) could not create a logical sequence in the story is of major concern.

Conclusions

- Most children are able to make sense of the thinking tasks and also evolve appropriate strategies to solve them.

- Children find the tasks interesting and are able to relate to them at an intuitive level. Thus even though many are not able to use the most efficient strategies to solve a given problem, they (lire able to arrive at a solution.

- The fact that more than 70 per cent children could solve four of the six tasks given indicates their natural capacities to 'make sense' of things around them. It would be perhaps appropriate to infer that most children relied on intuitive understanding and direct knowledge of their environment to solve the given problems. When facilitated with appropriate prompting in the form of cues, many were also able to cross the threshold of hesitation to work towards a solution to the task.

- Problems which demanded formal logical reasoning .abilities such as in tasks of classification and sequencing a story-were clearly more alien and hence more difficult for children to relate to.

- Children's exceptionally good performance on thinking tasks has significant implications for primary school curriculum development. Opportunities provided through such problem solving activity can facilitate a broader base of cognitive capacities in two ways: (a) by enhancing children's cognitive skills and (b) by enhancing children's self-esteem through a sense of accomplishment through self learning.

Arithmetic Tasks

TABLE 4.0A : PLACING θ NUMERALS IN ASCENDING ORDER N=97

Number of correct placements	Percentage
all ten cards	31
seven - nine cards	00
four - six cards	00
three cards	33
less than three cards	36
Source : **Task 1a : Sequencing Numerals**	

TABLE 4.0B : STRATEGIES OF SEQUENCING N=94

Strategy	Percentage
planned placing	31
placed at random	69
Source : **Task 1a : Sequencing Numerals**	

Tables 4.0A to 4.6F present children's performance on Arithmetic Tasks. Results indicate that children performed poorly on the task of sequencing numerals. 69% children were unable to place more than the first three cards (out of the given ten) in the correct sequence. These results were supported by the common observation that children could sequence numerals only to the limits of their own repertoire of counting. Only 31% children could place all ten cards in the correct sequence. It appears that children who can sequence more than the first three cards are those who are familiar with numerals upto 100 and can place them in an ascending order.

Most children who sequenced all the cards used a strategy of planned placing. Other children placed numerals at random' Reflecting perhaps an unstable sense of number.

TABLE 4.1A: RECOGNIZING NUMERALS N=96

Number of numerals recognized	Percentage
all four	39
three	22
two	27
one	10
none	02
Source : **Task Ib : Numeral Recognition**	

TABLE 4.1B : REVERSALS IN NUMERAL RECOGNITION

Percentage frequency of reversals	N=376	04
Percentage of children showing reversals	N=96	11
Source : **Task 1b : Numeral Recognition**		

Only 39% children recognized all four numerals. (Table 4.1A) in the numeral recognition task. Errors in numeral recognition included children's tendency to reverse the numeral, for ego reading 82 as 28. Few children even added the two numerals, for ego read 82 as 10. An analysis of reversals indicates that while the percentage of overall reversals is 4, the percentage of children showing reversals is 11. Further analyses revealed that 70% of those

children who correctly sequenced all the numerals also correctly recognized the four given numerals.

TABLE 4.2A (I) : GROUPING OBJECTS N=96

Response	Percentage
r : gan group	85
cannot group	15
Source : **Task 2a : Grouping**	

TABLE 4.2A (II) : STRATEGIES OF GROUPING N=91

Strategy	Percentage
ystimated	20
distributed in groups of two or more	65
distributed one at a time	12
'COunted before distributed	03
Source : **Task 2a : Grouping**	

Table 4.2A (I) and Table 4.2A (II) summaries children's performance and the strategies used in the task of grouping 40 objects. 85% (children were able to divide the 40 objects into four groups of 10 each. Most children (65%) distributed the objects in groups of twos or more. Only 12% divided on the basis of one each. While 20% .children used estimation as a strategy to distribute equally, only 3% counted all 140 objects before dividing.

TABLE 4.2B (I) : ESTIMATION OF OBJECTS IN EACH GROUP N=96

Response	Percentage
'can estimate	83
cannot estimate	17
Source : **Task 2a : Grouping**	

TABLE 4.2B (II) : STRATEGIES OF ESTIMATION N=92

Strategy	Percentage
<estimated without counting	07
counted one group	10
counted each group separately	84
Source : **Task 2a : Grouping**	

In a continuation of the analysis of Task 2a, Tables 4.2B(I) and 4.2B(II) indicate children's capacity to estimate the number of objects in each group after having divided. 83% children were able to estimate correctly. While 7% estimated without counting, 10% counted one group to estimate for all. The majority (84%) counted each group repeatedly, indicating an inefficient strategy. Often children's inability to group and estimate was because they did not know how to count beyond a certain number or did not remember all number names.

TABLE 4.2C (I) : ESTIMATION OF TOTAL NUMBER OF OBJECTS N=96

Response	Percentage
can estimate	81
cannot estimate	19
Source **: Task 2a : Grouping**	

TABLE 4.2C (II) : STRATEGIES OF ESTIMATION N=92

Strategy	Percentage
estimated without counting	07
regrouped	22
counted each group	33
counted all	39
Source **: Task 2a : Grouping**	

Further analysis presented in Tables 4.2C(I) and 4.2C(II) project the strategies children use- to estimate the total number of objects. Once again most children (81 %) were 'able to give a correct response. However only 7% children could estimate without counting even though there was considerable scope to build upon their own experience with the earlier stages of the task. A large number of children (39%) counted all the objects before giving their response, 33% counted each group and 22% tended to 'regroup' in order to estimate the total. For example, children estimated in the following manner : 10 plus 10 = 20, plus 20 = 40.

TABLE 4.3A : GROUPING OBJECTS N=93

Response		Percentage
can group		88
cannot group		12
Source : **Task 2b : Grouping**		

TABLE 4.3B : ESTIMATION OF OBJECTS IN EACH GRGUP,N==93

Response	Percentage
Lean group	86
cannot group	14
Source : **Task 2b : Grouping**	

TABLE 4.3C : ESTIMATION OF TOTAL NUMBER OF OBJECTS N=93

Response	Percentage
can group	85
cannot group	15
Source : **Task 2b : Grouping**	

A similar task of grouping using 28 objects was used to assess children's capacity to group a number that is not a multiple of either 5 or 10. Children's responses reveal that they were able to divide 28 objects into four groups with as much ease. Tables 4.3A, 4.3B and 4.3C show that 85 to 88 percent children were able to divide equally, estimate each group and give the total number of objects.

TABLE 4.4A : ADDITION AND SUBTRACTION THROUGH WORD PROBLEM N=97

Number of questions answered correctly	Percentage
all three	42
two	12
one	23
none	23
Source : **Task 3a : Word Problem**	

Results in Table 4.4A indicate that 42% children were able to answer. Correctly all three questions in the addition-subtraction word problem. Almost all of the 77% children who answered one question correctly in effect answered question correctly, which required the operation of addition. 54% were able to answer two questions which involved the arithmetical operations of addition and subtraction simultaneously. Error analysis revealed two main sources of error:

(i) children did not know which values were to be taken for adding and subtracting as per the question.

(ii) they made arithmetical mistakes while adding or subtracting given values. Those who were unable to answer even question no.1 (23%) perhaps did not understand

which arithmetical operations to apply or made arithmetical errors or else did not comprehend the problem.

TABLE 4.4B : STRATEGIES OF ADDING AND SUBTRACTING N=92

Strategy	Percentage
without counting	16
used iconic representation/fingers	71
used pictorial representation	13
Source : **Task 3a : Word Problem**	

An analysis of children's strategies (Table 4.4B) reveals that most children (71 %) use either fingers or an iconic representation such as tally marks (typical of traditional mathematics teaching) to add or subtract. Only 16% children were observed to perform the operation mentally while 13% used the pictorial representation given in the task itself. In essence, 84% children preferred to use a semi-concrete mode of performing elementary mathematical operations, an observation that is in keeping with available research and theoretical insights into children's learning.

TABLE 4.5A : MULTIPLICATION THROUGH WORD PROBLEM N=96

Response	Percentage
correct	81
incorrect	19
Source : **Task 3b : Word Problem**	

TABLE 4.5B : STRATEGIES OF MULTIPLICATION N=94

Strategy	Percentage
used multiplication table	40
used successive addition with iconic/ representation/fingers	60
Source : **Task 3b : Word Problem**	

Table 4.5A presents children's response to the word problem requiring the operation of multiplication. Most children (81%) solved the multiplication word problem correctly. Errors were either arithmetical in nature or because children did not know how to count beyond a certain number. Table 4.5B indicates that while 40% children used the multiplication table to arrive at the solution, 60% used the method of successive addition with fingers or iconic representation such as tally marks. Children's need to resort to semi-concrete/concrete modes is evident in this case as well.

TABLE 4.6A : TWO DIGIT ADDITION N=96

Response	Percentage
correct	75
incorrect	25
Source : Task 4 : Formal arithmetic	

TABLE 4.6B : TWO DIGIT ADDITION WITH CARRY OVER N=96

Response	Percentage
correct	38
place value disregarded	31
incorrect	31
***Source* : Task 4 : Formal arithmetic**	

TABLE 4.6C : TWO DIGIT SUBTRACTION N=96

Response	Percentage Item Scores
correct	56
incorrect	44
***Source* : Task 4 : Formal arithmetic**	

TABLE 4.6D : TWO DIGIT SUBTRACTION WITH BORROWING N=96

Response	Percentage
correct	22
borrowing disregarded	06
incorrect	72
***Source* : Task 4 : Formal Arithmetic**	

In the formal arithmetic tasks (Tables 4.6A and 4.6B) requiring addition, 75% children solved the addition problem without carry over whereas only 38% solved the problem of addition with carry over. In the formal' arithmetic tasks (Tables 4.6C and 4.6D) requiring subtraction, 56% children solved the subtraction problem without borrowing whereas only 22% children solved the subtraction problem with borrowing.

It is evident that children find it difficult to comprehend the concept of place value entail in such tasks, even though some of them have acquired the algorithmic skill of borrowing and carry over. Results also clearly indicate that the formal arithmetic operation of subtraction poses a greater challenge' for children.

TABLE 4.6E : STRATEGIES OF ADDING AND SUBTRACTING N*=52

Strategy	Percentage
solved mentally	19
used finger/iconic representation	81
Source **: Task 4 : Formal Arithmetic** ** data for only* 52 *children was recorded*	

Table 4.6E presents the strategies children employed in solving formal arithmetic problems. Most children (81 %) relied an concrete/semi-concrete methods in order to solve the problem. These results echo the earlier findings of addition and subtraction through word problems where 84% children used fingers or iconic pictorial representation.

TABLE 4.6F : USE OF PLACE VALUE IN ADDITION AND SUBTRACTION N*=36

Response	Percentage
added tens first	56
added units first	44
Source : **Task 4 : Formal Arithmetic** ** data for only* 36 *children was recorded*	

Table 4.6F presents results of children's understanding of place value in solving formal arithmetic problems. More than half (56%) of the children started with the problem with the tens first. This incorrect strategy accounts for a high percentage of incorrect solutions to the addition problem with carry over and the subtraction ' problem with borrowing. Only 44% children began appropriately with the units place first and yet only 30% arrived at the correct answer. Therefore children who knew how to proceed still get the wrong answers perhaps due to arithmetical errors or due to a lack of a conceptual understanding of the use of place value.

Given the nature of the tasks, it has been possible to compare children's understanding of arithmetical operations within meaningful contexts (word problem) and in abstraction (formal arithmetic). As expected, a higher number of children have performed successfully on the word problems. 81 % were able to solve the word problem requiring the operation of multiplication. With regard to the word problem requiring addition and subtraction, 77% children solved at least one of the three given questions requiring the operation of addition. 54% solved two of the three questions and 42% were able to solve all three questions requiring the operations of both addition and subtraction. It is worth mentioning that the 81 % children who solved the multiplication word problem in effect used the strategy of successive addition.

It seems that while the multiplication word problem (requiring addition and subtraction) is essentially one-dimensional, the other word problem is a more complex task. The latter perhaps requires cognitive capacities other than a mathematical sense or the understanding of mathematical operations alone. It puts heavy demands on children to process information as well as the capacity to construct the meaning of the problem before finally attempting to apply the appropriate arithmetical operation. It is therefore not surprising that many more children (81 percent) were able to solve the multiplication word problem whereas only 42 percent solved the word problem requiring the operations of addition and subtraction.

If questions nos. 2 and 3 in the word problem requiring addition and subtraction were to be translated into a formal arithmetic task they would require children to borrow. As stated earlier children performed far better on word problems when compared to formal arithmetic tasks requiring the algorithmic skill of borrowing and carry over. Only 38% children could solve the additions problem with carry over, and only 22% could solve the subtraction problem with borrowing. Thus the nature of task when context-bound and meaningful allows children to even deal with large numbers without the demands of the procedural knowledge of place value.

Conclusions

- The ability to sequence numerals (in this case up to 100) is closely related to children's repertoire of number names, their capacity to understand the concept of one more and their familiarity with written numbers. A sense of confidence with number and numerals seems to be essential in the use of the strategy of placing numerals in a planned manner while sequencing. It is also evident that the use of certain strategies during classroom activity enhances the learning of number sense in children. Errors clearly reveal that children are often left to themselves to make sense of the task given' or the strategy/method to be employed to solve the task. Teaching methodologies appear to be employed independent of how children approach particular problem in order to solve it.

- The most frequent strategy adopted by children to divide objects equally seems to be one of using groups and estimation. Using a one-to-one correspondence or dividing on the basis of the total number of objects does not seem to be a method taught in school. Nor does it appear to be a spontaneous manner of making sense of the task and solving the problem. Most children also tended to indulge in repeated counting in order to answer specific questions relating to quantity, indicating a lack of confidence with number;' Another striking feature of children's performance is their inability to relate subtasks to a whole. As is evident (see Appendix A(iii)) the task on grouping involved several short steps. At each step children were asked appropriate questions to assess the depth of their understanding. Most children neither made use of previous

information or knowledge of the earlier steps, nor did they build upon their own experiences of the task to evolve efficient strategies to arrive at a solution. The few who did, have emerged to be spontaneous learners despite a rigid system of teaching by a given method alone.

- A larger number of children found it easier to relate to word problems. This is particularly' so in comparison to tasks of formal arithmetic. Results appear to challenge a common belief that children learn to 'apply' their understanding of arithmetical operations only after they have grasped the algorithmic mechanism. Present findings seem to suggest that when arithmetical tasks are given in a meaningful context, children get the opportunity to 'construct' notions of arithmetical operations while making sense of the task. This when corroborated with more investigative analysis is likely to have far reaching implications for primary school mathematics teaching. For instance, it is worth exploring whether context-based tasks ought to be viewed as learning experiences and opportunities for young children rather than as tasks to promote applicative knowledge.

- Most children reflect the tendency and the need to resort to concrete and semi-concrete modes to solve problems that demand abstraction. This is in keeping with the developmental levels of children of the primary school age. Such a finding necessitates the use of such methods in classroom situations. This in turn has significant implications for the need to move beyond the textbook approach in primary classes.

- Majority children spontaneously use strategies of successive addition to solve a word problem of multiplication. It seems that the drill of multiplication tables by itself does not help children to construct notions of multiplication and its application in real life. Contrarily, real life situations that call upon the capacity to multiply seems to be a better starting point. Clearly, children will first appreciate that multiplication is successive addition before getting excited about seeing/noticing patterns in a multiplication grid.

- Formal arithmetic tasks and specifically tasks that demand an understanding and application of place value pose the greatest challenge to second graders. While evidence exists wherein some children appear to have 'mastered' the algorithmic operation of borrowing or carrying over, their understanding of place value is still fragile and unstable. Context bound problems involving larger numbers have clearly baffled children much less as compared to tasks demanding procedural knowledge of formal arithmetic. Children have also demonstrated an inability to review their own problem solving approaches, often obsessed with the mechanics of the method or a one- correct answer approach.

- Findings also throw light on the significance of the nature of tasks. While word problems evoke meaningful situations and inevitably lead to better performance, the type of word problems offer a series of challenges to young learners, requiring multiple capacities.

The study infect demonstrates the use of such tasks as worth while learning experiences for enhancing mathematical thinking - thus advocating a shift from algorithmic approaches to teach mathematical skills to promoting mathematical thinking and problem solving.

ABLE 5 : SUMMARY SCORES FOR LANGUAGE, THINKING AND ARITHMETIC N=87

Tasks	Mean scores	Mean percentage	SD
Language	123	48	06
Thinking	15	64	06
Arithmetic	15	61	06
Source **: Children's performance on Language, Thinking and Arithmetic Tasks**			

Table 5 represents the summary scores for the three areas of language, thinking and arithmetic. As is evident, children have scored better on tasks of thinking and arithmetic. On these the mean percentage scores are 64 and 61 respectively. In comparison, on language, children have obtained a mean percentage score of only 48. The spread of. scores as indicated by the standard deviation score on all there types of tasks is fairly good. This suggests that the task items selected for assessing children's cognitive attainment levels in all three areas have successfully discriminated children of varying capacities and abilities.

IV : MAJOR ISSUES FOR CURRICULUM DEVELOPMENT, TRANSACTION AND EVALUATION

- Move beyond the textbook. Introduce supplementary teaching learning materials.
- Allow children to resort to concrete, semi-concrete methods of problem solving.
- Focus on teaching-learning activities that enhance mathematical thinking rather than algorithmic skills.
- Use evaluation methods that help capture 'process' of problem - solving and scholastic achievement.
- Make learning experiences problem-solving activities of self-learning and discovery.
- Allow children to check their own learning by providing opportunities to arrive at a solution using diverse methods/routes.
- Use information on 'process' to adapt and evolve teaching approaches.
- Bring in the use of dialect in the classroom. Develop children's self- confidence in their own language.
- Focus on listening and articulation activities in the language curriculum. Focus on teaching language as communication.
- Relate reading and writing tasks to children's own world and context. For instance, give print to children's expressions, vocabulary, thoughts, stories etc.
- Include problem solving and thinking activities in the primary school curriculum. These

can and must be woven in with school subjects. Such problem solving tasks will also help to break the commonly held notion that all education involves the teaching and learning of a one correct answer.

- Problematize subject knowledge to enable the development of broader and more reflective cognitive capacities. Such tasks will 'also enable children to use their own intuitive, natural capacities, tendencies and strategies and feel a sense of accomplishment and confidence.
- Individual thinking styles of children in the classroom, thus encouraging creativity.
- Encourage the much needed focus on the 'process' of learning rather than the 'what' of learning and use it for evaluative feedback for curriculum improvement.

Appendix A (III) : गणित

गतिविधि 1 : संख्याओं को क्रम से लगाओं

उद्देश्य : 1 कम और अधिक का ज्ञान, 2 संख्याओं की पहचान

गतिविधि क्रिसान्वयन की प्रक्रिया : संख्या कार्डो को उलटे–सीधे क्रम में बच्चे के सामने रख दीजिए, बच्चों से कहिए '' सबसे छोटी संख्या सबसे पहले रखें, उसके बाद उससे बड़ी, फिर उससे बड़ी। इस तरह सभी संख्या कार्डो को क्रम से लगाओं'' जब बच्चा संख्या कार्डो को क्रम से लगा ले या नहीं लगा पाए, तो 4 कार्ड एक एक करके, उठा कर उससे पूछो ''यह कौन सी संख्या है''

अवलोकन एंव रिकार्ड करना :

(a) बच्चा कार्डो को क्रम से लगाने के लिए क्या तरीका अपनाता है बच्चा सभी कार्डो को ध्यान से देखता है फिर उन्हें क्रम से लगाता है या कुछ कार्ड लगा देता है जैसे 4–9–15–64 फिर 27 और 34 उनके बीच में लगाता है, या कोई और तरीका अपनाता है। नोट कर लो।

(b) बच्चा जिस क्रम से भी लगाए उसे नोट कर लो जैसे 4, 9, 15, 27, 34, 49, 54, 65, 74, 82, 93

(c) बच्चे से जब संख्या पहचान के बारे में पूछो तो उसे इस तरह नोट करो : आपने पूछा (54 का कार्ड दिखाकर) ये क्या है? बच्चा बोला 45 है उसे इस तरह लिख तो 54–45

गतिविधि 2 : समूहीकरण

उद्देश्य : चीजो को बराबर बाँटने की समझ, बराबर की अवधारणा, समूह की समझ।

गतिविधि क्रियान्वयन की प्रक्रिया :

(1) बच्चों को बोतने के 40 ढक्कन दो। बच्चे से कहो कि इन ढक्कनों को अपने चार दोस्तों में बराबर–बराबर बाँटो;

(2) हर दोस्त के पास कितने ढक्कन है?

(3) कुल कितने ढक्कन है?

अवलोकन एवं रिकार्ड करना : इस गतिविधि में जब बच्चा ढक्कन बाँटता है, बताता है हर दोस्त के पास कितने और कुल कितने ढक्कन है तो यह महत्वपूर्ण है कि हम यह नोट करे कि बच्चा उत्तर जानने के लिए लिये क्या तरीका अपनाता है जैसे :

(a) जब बच्चा चारों दोस्तों में ढक्कन बाँटता है तो क्या वह एक–एक करके चारों को देता है, चार–चार करके देता है या पहले सारे ढक्कन गिनता है फिर चारों को बराबर–बराबर बाँट देता है। बच्चा कौन सा तरीका अपनाता है उसे नोट करना है। बच्चा जो जवाब देता है (ठीक या गलत) उसे नोट करना है।

(b) बच्चा एक दोस्त के ढक्कन गिनकर सबके बताता है या चारों दोस्तों के अलग–अलग गिनता है या कोई और तरीका अपनाता है उसे नोट करो। बच्चे का जवाब नोट करो।

(c) कुल ढक्कन गिनने के लिये वो एक दोस्त के ढक्कन गिनकर उसे 4 से गुणा करता है, एक एक करके चारों दोस्तों के ढक्कन जमा करता है– 10+10+10+10, या फिर' एक–एक करके सारे ढक्कन गिनता है। बच्चा जो भी तरीका अपनाता है उसे नोट कर लो। बच्चे का जवाब नोट कर लो।

ऊपर दिये गये तरीके कुछ उदाहरण है कि बच्चा सवाल कैसे हल करता है पर बच्चा कई और तरीके अपना सकता है। बच्चा जो भी तरीका अपनाए उसे बारीकी से नोट करो। बच्चे के तरीके को सही तरीके से समझने के लिये अगर बच्चे से बात करने की जरूरत पड़े तो करो। यही गतिविधि 28 ढक्कनों के साथ भी करनी है।

गतिविधि 3 : इबारती सवाल – 1

उद्देश्य : जमा–घटा का मौखिक ज्ञान और सवाल हल करने में उनका उपयोग

गतिविधि क्रियान्वयन की प्रक्रिया :

बच्चे के सामने यह पृष्ठ रखो ओर साथ मौखिक रूप से सवाल बच्चे को बताओ

OOOOOOOOOO
OOOOOOOOOO
OOOOO 25 तरबूज

तरबूज बचेने वाली के पास 25 तरबूज थे

पहले दिन उसने पाँच तरबूज बेचे

OOOOO पाँच तरबूज

दूसरे दिन उसने 11 तरबूज बेचे

OOOOOOOOOOO 11 तरबूज

O

तीसरे दिन बेचारी का एक भी तरबूज नहीं बिका

चौथे दिन फिर उसने 3 तरबूज बेचे

OOO 3 तरबूज

बच्चे को सवाल बताते हुए बीच–बीच में उनसे पूछते रहना होगा। जैसे आप कहते हैं ''पहले दिन 5 तरबूज बिके '' उसके बाद बच्चे से तुरन्त पूछो '' पहले दिन कितने तरबूज बिके''। जब पूरा सवाल बता दो तो बच्चे से कहो कि वह पूरा प्रश्न दोहराए। इससे यह समझ आ पाएगा कि बच्चा सवाल समझ पाया या नहीं।

बच्चे को सवाल समझाने के बाद बच्चे से यह तीन प्रश्न इस क्रम से पूछो।

1. कुल कितने तरबूज बेचे?
2. चौथे दिन के बाद कितने तरबूज बचे?
3. तीसरे दिन के बाद कितने तरबूज बचे?

अवलोकन एवं रिकार्ड करनाः

(a) सवाल हल करने का तरीका : बच्चा सवाल हल करने के लिये क्या तरीका अपनाता है? बच्चा अपने दिमाग में गिनता है। अँगुलियों पर गिनता है। कागज़ पर बने तरबूजो से गिनता है। लिख कर हल करता है। या कोई और तरीका अपनाता है। बच्चा जो भी तरीका अपनाना है उसे नोट करो।

(b) सवाल हल करने में गलतियां : बच्चा यह निर्णय नहीं कर पाता कि किस सवाल को हल करने के लिये किस–किस दिन के तरबूजों को घटाना या जोड़ना है। जैसे बच्चों से पूछा ''तीसरे दिन के बाद कितने तरबूज बचे'' और बच्चा चारों दिन के तरबूज घटा देता है।

(c) सवाल हल करने के लिये तरीका तो ठीक अपनाए लेकिन गणना करते समय गलती कर दे जैसे 11+ 5 = 17। घटा की जगह जोड़ दे या जोड़ की जगह घटा दे। या कोई और गलती कर दे उसे बारीकी से नोट करो।

(d) सवाल ठीक किया या गलतः बच्चा जो भी जवाब दे ठीक या गलत उसे प्रश्न संख्या के आगे नोट कर लें।

गतिविधि 3 : इबारती सवाल – II

उद्देश्य : जमा, गुणा, का मौखिक ज्ञान और सवाल हल करने में उनका उपयोग

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो, '' मनदलाल के पास पेन्सिल के 5 डिब्बे हैं। हर एक डिब्बे में 5 पेन्सिल हैं। बताओ मदनलाल के पास कुल कितनी पेन्सिलें हैं।''

अवलोकन एवं रिकार्ड करना :

(a) तरीका : बच्चा सवाल हल करने के लिये क्या तरीका अपनाता है उसे नोट करो। जरूरत हो तो बच्चे से पूछो कि उसने सवाल कैसे हल किया ताकि बच्चे का तरीका समझ आ सके।

(b) ठीक या गलत : बच्चा जो भी जवाब दे (ठीक या गलत) उसे नोट करो।

गतिविधि 4 : लिखित जमा घटा

उद्देदय : जमा – घटा करने के औपाचारिक तरीके का ज्ञान और स्थानीय मान की समझ

गतिविधि क्रियान्वयन की प्रक्रिया :

बच्चे को एक कागज़ पर यह चार सवाल इस क्रम में लिखे कर दो।

नीचे लिखे सवाल हल करो।

	3	4			7	9			8	3			4	4	
+	2	5		−	5	4		−	1	4		+	5	8	
	5	9			2	5			6	9			1	0	2

अवलोकन एवं रिकार्ड करना : बच्चों द्वारा हल किए सवालों के कागज़ को Record Sheet के साथ लगा दो

(a) तरीका : बच्चा सवाल हल करने के लिये क्या तरीका अपनाता है उसे नोट करो जैसे बच्चा मन में गिनता है, अंगुलियों पर गिनता है, ।।।। लकीरे खींच कर गिनता है।

(b) बच्चा किस तरह की गलतियाँ करता है जैसे दहाई के अंक को पहले जोड़ता है या घटाता है या कोई और गलती करता है उसे नोट करो।

Appendix A (II) : सोच–विचार

गतिविधि 1 : समस्या समाधान – I

उद्देश्य : तार्किक क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे को चार माचिस की तीलियाँ दो और कहो '' इन चार तीलियों से एक चौकोर बनाओ'' इगर बच्चे को चौकोर का मतलब नहीं मालूम तो उसे एक चौकोर बना कर दिखाओ। फिर बच्चे को कुल सात तीलियाँ देा और कहो ''इन सात तीलियों से दो चौकोर बना कर दिखाओ।

उत्तर : □□

इस गतिविधि में बच्चे की मदद करने की आवश्यकता पड़ सकती है। उदाहरण के लिये बच्चा एक □ बनाता है। और एक □ बनता है। आप बच्चे से कहते है ''□ इस चौकोर में एक तरफ से खुला है। क्या सभी तीलियों को मिलाकर 2 चौकोर बना सकते हो'' यह बच्चे की मदद करना हुआ। या बच्चा चार तीलियों से एक चौकोर बना देता है फिर कहता है कि तीन तीलियों से एक और चौकोर नहीं बन सकता। आप कहते हैं '' हो सकता है सात तीलियों को मिलाकर दो चौकोर बन जाएं। कोशिश कर के देखो'' यह भी मदद करना हुआ।

अवलोकन एवं रिकार्ड करना :

(a) बच्चे को मदद की आवश्यकता पड़ी अथवा नहीं। अगर हाँ तो किस तरह से मदद करी वो नोट करो।

(b) बच्चा 2 चौकोर बना पाता है या नहीं।

(c) अगर बच्चा नहीं बना पाता तो क्या करता हे उसे नोट कर लो। ईीस तरह से □□ या जा भी करता है उसे नोट करो।

गतिविधि 1 : समस्या समाधान – II

उद्देश्य : तार्किक क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो – '' मान लो आपके पास एक जग, एक ग्लास, एक पतीला है। जग दूध से भरा हुआ है। आपको अपने पड़ोसी को $2\frac{1}{2}$ ग्लास दूध देना है। या रहे दूध जग में ही देना है। आप कैसे नापकर देगें''। इस गतिविधि में बच्चे की मदद रकनी पड़ सकती है। उदाहरण के लिये बच्चा कहता है ''ग्लास से नापकर $2\frac{1}{2}$ दूध दे देगें''। आप कहतें हैं कि दूध जग में देना है जो जग में और भी दूध है। बच्चा सोचता है और फिर कोई और समाधान बताता है। यह बच्चे की मदद करना हुआ।

अवलोकन एवं रिकार्ड करना :

(a) समस्या के समाधान के लिये बच्चा क्या तरीका बताता है चाहे वो सही या गलत हो उसे ठीक उसी तरह नोट करो।

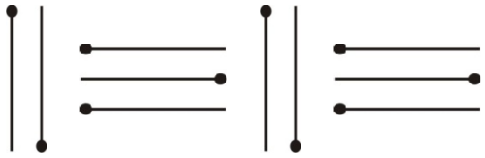
(b) इस समस्या को हल करने के लिये बच्चे की मदद करनी पड़ी या नहीं।

(c) बच्चा समस्या का हल कर पाता है या नहीं।

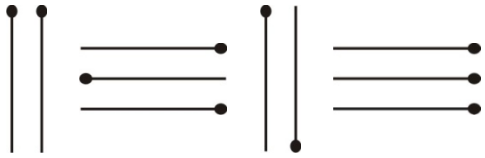
गतिविधि 2 : पेटर्न को आगे बढाओ

उद्देश्य : तार्किक क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : माचिस की तीलियों से बच्चें के सामने इस तरह का पेटर्न बनाओं अब बच्चों को तिल्लियाँ दे दो और कहो '' इस पैटर्न को आगे बढ़ाओ''।



अवलोकन एंव रिकार्ड करना : बच्चे द्वारा बनाया गया पैटर्न बच्चा जिस तरह भी पेटर्न को आगे बढ़ाया है उसे कागज पर उतार लो। इस पटर्न में दो बातें पहली यह कि दो तीलियाँ खड़ी हैं फिर तीन तीलियाँ लेटी हैं, फिर दो खड़ी है, तीन लेटी है। दूसरी बात यह है कि एक बार मसाला एक तरफ है दूसरी बार दूसरी तरफ हो सकता है बच्चा इनमें से एक बात पकड़े, एक छोड दे या दोनों पकड़े जैसा भी हो उसे ध्यान से देखकर कागज पर उतार लो कागज पर इस तरह उतार सकते हो।



गतिविधि 2 : पेटर्न को आगे बढाओ – II

उद्देश्य : तार्किक क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे को पेटर्न का अर्थ समझाने के लिये पहले तीन जोकर बनाओ और फिर चौथा जोकर बना कर दिखाओ और कहो कि पेटर्न पूरा हो गया।

अब बच्चे को एक कागज दो जिसमें नीचे बने पेटर्न बने हुए हो। इन पेटर्न को एक कागज पर बनाकर पहले से ही सब बच्चों के लिए एक साथ फोटो कापी करा लो ताकि सभी बच्चों को एक सा पेटर्न मिल सके। बच्चे से कहो कि इस पेटर्न को आगे बढ़ाओ।

अवलोकन एवं रिकार्ड करना : जिस पर पेटर्न बना हो उसे Record Sheet के साथ लगा दो। अगर बच्चा इसके बारे में कुछ कहता या करता है तो उसे नोट करो।

गतिविधि 3 : तस्वीर जोडो

उद्देश्य : Part-whole Relationship

गतिविधि क्रियान्वन की प्रक्रिया : बच्चे के सामने तस्वीर के सभी टुकड़े रखो। बच्चे से कहो ''इस तस्वीर को छः भागों में काटा हुआ है इस तस्वीर में पतंग, डोर और चरखी हैं। इन्हें जोड़ कर तस्वीर पूरी करो''

अवलोकन एवं रिकार्ड करना :

(a) तस्वीर जोड़ने का तरीका–बच्चा किस तरह से तस्वीर जोड़ने की कोशिश करता है। कटे हुए कोनों को मिलाने की कोशिश करता है, तस्वीर के आधार पर अलग–अलग भागों को जोड़ने की कोशिश करता है, पूरी तस्वीर को दो अलग–अलग भागों में जोड़ता है जैसे पतंग जोड़ कर एक तरफ रखता है, चरखी जोड़ कर दूसरी तरफ रखता है या कोई अन्य तरीका अपनाता है उसे नोट करो।

(b) कितने भाग जोड़ पाता है:– छः में से चार भाग जोड़ता है, तीन जोड़ता है, कितने भी जोड़े उन्हें संख्या (1, 2, 3, 4) में नोट करो।

(c) तस्वीर का जो भाग नहीं जोड़ पाए या गलत जोड़े उसकी क्रम संख्या नोट करो।

(d) सही जोड पाया या नहीं (✕ / ✓)।

गतिविधि 4 : फर्क ढूंढों

उद्देश्य : अवलोकन क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो – ''यह दोनो चित्र (फोटो) देखने में एक जैसे हैं। लेकिन इनमें छोटे पाँच अन्तर / फर्क हैं। पाँचों अन्तर क्या हैं? उन्हें ढूंढों और बताओ''।

अवलोकन एवं रिकार्ड करना :

(a) बच्चा जितने भी अन्तर बताए उन्हें नोट करो। बच्चा इन पाँच अन्तरों के अलावा भी कोई अन्तर बताए (जैसे Photo Copy के अन्तर) तो उसे नोट करो।

पाँच अन्तर :

1. एक कड़ाही का कुण्डा है, एक का नहीं है
2. एक लड़की के हाथ में चूड़ियां नहीं है।
3. एक मुर्गे की चोंच नहीं है
4. एक आदमी की मूंछ नहीं है
5. एक आदमी की पगड़ी अलग है

गतिविधि 5 : लुका छिपी

उद्देश्य : अवलोकन करने की क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे के सामने तस्वीर रखो और कहो ''इस चित्र में 10 पशु–पक्षी, कीड़े–मकौडे छिपे हुए हैं। उन्हें ढूंढों और बताओ'' हो सकता है बच्चा पुश–पक्षी, कीड़े–मकोड़े कानाम नहीं जानता हो लेकिन हाथ लगा कर बता दे किये एक जानवर है, ये एक पक्षी है। ऐसे में उसका जवाब ठीक माना जाएगा।

अवलोकन एवं रिकार्ड करना : बच्चा जितने पशु–पक्षी ढूंढ पाए उनकी संख्या नोट करो।

गतिविधि 6 : 'क्या है एक जैसा क्या है अलग'

उद्देश्य : वर्गीकरण करने की क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो ''यह चार तस्वीरें हैं। इनमें तीन तस्वीरों में कुछ समानता है लेकिन एक तस्वीर में वो समानता नहीं है। वो कौन सी तस्वीर है जो दूसरी तस्वीरों से अलग है''। इस गतिविधि में बच्चों की मदद करने की आवश्यकता पड़ सकती है। मान लो बच्चे को गतिविधि समझ नहीं आती तो आप उदाहण से समझा सकते हो। आप कापी, पने, किताब, कुर्सी का उदाहण ले सकते हो। आप कह सकते हो कि कापी, पने, किताब में एक समानता है कि वो पढ़ने–लिखने के काम आती है लेकिन कुर्सी में यह समानता नहीं है क्योंकि यह बैठने के काम आती है। तो कुर्सी इन तीनों से अलग हुई।

अवलोकन एवं रिकार्ड करना :

(a) कौन सी तस्वीर अलग है– बच्चा जो भी तस्वीर अलग बताए उसे नोट करो।

(b) कारण–बच्चे से पूछो कि यह तस्वीर बाकी तस्वीरों से किन मायनों में अलग है। बच्चा जो भी कारण बताए उसे नोट करो।

Appendix A (I) : भाषा

गतिविधि 1 : कहानी पढ़ना

कहानी : गुलगुला–पुलपुला

बहुत पुरानी बात है। एक नदी थी। नदी के पास एक पेड़ था। पेड़ जामुन का था। पेड़ पर बन्दर रहता था। उसका नाम पुलपुला था। पुलपुला जामुन खाता था। नदी में नहाता था। पेड़ पर सोता था। मजे करता था।

पास ही एक पहाड़ी थी। पहाड़ी पर एक घर था। उसमें एक लड़का रहता था। उसका नाम गुलगुला था। गुलगुला पुलपुला साथ खेलते थे। दोनों मजे करते थे। बहुत मजे करते थे। एक बाद दोनों खेल रहे थे। नदी पास ही थी। नदी सेएक मगरमच्छ निकला। वह बहुत बड़ा था। मगरमच्छ बोला आओ मेरी पीठ पर आओ। नदी में मौजें खायें। दोनों मान गये। मौजें खायीं। तब से रोज मजे करते थे।

उद्देश्य : पढ़ने की क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो ''इस कहानी को पढ़ो'' जब बच्चा कहानी पढ़ ले तो उससे पूछो ''कहानी कैसी लगी' उसके बाद नीचे लिखे सवाल इस क्रम में पूछें।

1. पेड किस चिज़ का था?
2. गुलगुला का घर कहाँ था?
3. पुलपुला क्या खाता था?
4. मगरमच्छ ने दोनों से क्या कहा?

अवलोकन एवं रिकार्ड करनाः

(a) कहानी पढने का तरीका

  (i) बच्चा अक्षर जोड़–2 कर पढ़ता है या नहीं
  (ii) मात्राऐं ठीक ढंग से पढ़ता है या नहीं
  (iii) बच्चा किस प्रकार की गलतियाँ करता है।

(b) बच्चा कितना पढ़ पाता है– एक पैराग्राफ/दो पेराग्राफ/कुछ वाक्य/कुछ शब्द/कुछ अक्षर

(c) प्रश्न–उत्तर

जब बच्चा प्रश्नों का उत्तर देता है तब

(i) गलत या सही उत्तर बता रहा है।
(ii) सही उत्तर के आस पास की चीज़ बता रहा है।
(iii) उसका चेहरा एकदम सपाट है और कोइ उत्तर नहीं दे रहा है।

(iv) अगर बच्चा गलत जवाब दे रहा है तो उसे कहानी फिर से पढ़ने को दो और कहो देखों कहानी में इस प्रश्न का क्या उत्तर लिखा है।

बच्चा जिस वाल का जो जवाब दे उसे ठीक उसी तरह उतार लो। अगर बच्चा जवाब नहीं देता या कुछ और बात कहता है तो यह भी नोट कर लो। दूसरा प्रश्न पूछने से पहले, पहला उत्तर नोट कर लो।

गतिविधि 2 : तस्वीर के बारे में लिखना

उद्देश्य : लिखने की क्षमता

गतिविधि क्रियान्वन की प्रक्रिया : बच्चे के सामने तस्वीर रख दो और बच्चे से कहो ''इस तस्वीर को ध्यान से देखो'' जब बच्चा तस्वीर देख ले तो मौखिक रूप से एक दो सवाल पूछो जैसे ''यह कौन सा जानवर है?'', ''यह बच्चा क्या कर रहा है?'' जरूरत पड़े तो बच्चे की मदद भी करो। फिर बच्चे से कहो ''इस तस्वीर में क्या–क्या है, क्या–क्या हो रहा है, जो भी तुम्हारा मन करे उसके बार में चार वाक्य लिखो''। (पहले बातचीत करेंगे)

इस गतिविधि में बच्चे को दुबारा मदद की आवश्यकता पड़ सकती है। मान लो बच्चा कुछ भी नहीं लिख रहा है। उससे दुबारा बातचीत करो जैसे ''यह कौन सा जानवर है, यह बच्चा क्या कर रहा है, इस जानवर का नाम कैसे लिखेंगे''। कोशिश यह करनी है कि बच्चा कुछ ना कुछ जरूर लिखे, चाहे एक शब्द, एक अक्षर ही लिखे।

अवलोकन एवं रिकार्ड करना : बच्चा जो कुछ भी लिखे उेस रिकार्ड शीट के साथ लगा दो। अगर कोई अन्य बात हो तो उेस नोट कर लो।

गतिविधि 3 : कहानी सुनना

कहानी : मुनिया ने सोना पाया

एक चिड़िया थी, उसका नाम था मुनिया एक दिन उसे बहुत भूख लगी थी वो उड़ते–उड़ते एक बगीचे में जा पहुँची। वहाँ उसे एक सुनहरा बेर मिला। वो बेर को चोंच में दबा कर एक ऊँचे पेड़ पर जा बैठी। मौसम बहुत अच्छा था, ठण्डी–ठण्डी हवा चल रही थी। मुनिया का मन गाने को किया, पर जैसे ही मुनिया ने गाने के लिये मुँह खोला बेर नीचे गिर गया। मुनिया ने बेर बहुत ढूंढ़ा पर उसे नहीं मिला। मुनिया ने खाने के लिये नया बेर तो ढूंढ लिया पर मुनिया उस सुनहरे बेर को नहीं भूली। वो हर रोज उसपेड़ के नीचे आती जहाँ उसका बेर गिरा था और सुनहरा बेड ढूंढती। एक दिन उसने देखा कि जहाँ उसका बेर गिरा था, वहाँ छोटा सा पौधा निकल आया है। मुनिया को पौधा अच्छा लगने लगा। वो पौधे को देखा। पौधे की नरम–नरम पत्तियाँ देखकर खरगोश उसे खाने को बढ़ा मुनिया यह सब देख रही थी वह थोडा सा उर गयी पर जैसे ही खरगोश ने पौधा खाने के लिये मुँह आगे किया, मुनिया ने गुस्से में चीखा। खरगोश चीख सुनकर भाग खडा हुआ। मुनिया को पौधे की चिन्ता हो आई थी। वो उसको बचाना चाहती थी। उसने घास–फूस और तिनके इक्ट्ठे किये और पौधे के आस–पास एक दीवार बना दी। पौधा अब सुरक्षित था। मुनिया वहाँ अपने दोस्तों के साथ आती और उसके आसपास खेलती और पौधे की

देखभाल भी करती। देखते–देखते पौधा बड़ा होने लगा और फिर एक हरा–भरा पेड़ बन गया। एक दिन मुनिया को ये देखकर बहुत हैरानी हुई कि उस पेड़ पर एक बेर लगा हुआ है। वो बेर बिल्कुल ऐसा सुनहरा था जैसा एक दिन उसने खोया था। मुनिया बहुत खुश हुई। कुछ दिनों बाद उस पेड़ पर बहुत सारे बेर आ गए। मुनिया ने अपने दोस्तों के साथ खूब बेर खाए और बहुत मजे किये।

उद्देश्य : सुनना और सुनकर समझना

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे को 'मुनिया ने सोना पाया' कहानी सुनाओ कहानी सुनाने के लिये अच्छा है कि कहानी याद हो ताकि पूरे हाव–भाव के साथ कहानी सुनाई जा सके। कोशिश रहे कि कहानी सुनाने का तरीका सभी बच्चों के साथ एक सा रहे। कहानी सुनाने के बाद बच्चे से इस क्रम में ये सवाल पूछो।

1. जब मुनिया को भूख लगी थी और जब वह बगीचे में आई तो उसे क्या मिला?
2. मुनिया के मुँह से बरे कैसे गिर गया?
3. जब खरगोश पौधे के पत्ते खाने के लिये आगे बढ़ा तो मुनिया ने क्या किया?
4. मुनिया को क्या देख कर हैरानी/ताज्जुब/आश्चर्य हुआ?

चौथे प्रश्न में हो सकात है कि बच्चे को हैरानी/ताज्जुब/आश्चर्य का अर्थ स्पष्ट ना हो। इसके लिये कहानी सुनाते समय हम इसे स्पष्ट कर दो तो अच्छा रहेगा। आवर्श्य को स्पष्ट करने के लिए हम कहानी सुनाते वक्य कह सकते हो कि ''मुनिया को बहुत आश्चर्य हुआ उसने कहा अरे ये क्या है।''

अवलोकन एंव रिकार्ड करना : प्रश्नों का उत्तर बच्चा जो भी जवाब दे उसे बच्चे की भाषा में ठीक उसी तरह उतार लो। दूसरा प्रश्न पूछने से पहले, पहना उत्तर नोट कर लो। जब बच्चा जवाब दे तो हो सकता है वह अपने मन से कुछ और भी जोड़ दे जैसे मुनिया को 'मीठा' बेर मिला अब मीठा शब्द कहानी में नहीं है ये बच्चे ने अपनी तरफ से जोड़ा है। इसे अवश्य नोट कर लो।

गतिविधि 4 : तस्वीरों को क्रम से लगाना और कहानी बनाना

उद्देश्य : चिंतन प्रक्रिया, अभिव्यक्त करने की क्षमता

गतिविधि क्रियान्वयन की प्रक्रिया : बच्चे से कहो ''यह कुछ तस्वीरें हैं, इन तस्वीरों में एक कहानी छिपी है। पहली तस्वीर यह है (पहली तस्वीर दिखाते हुए) आप बताओ इसके बाद कौनसी तस्वीर आएगी, उसके बाद कौनसी, फिर उसके बाद कौनसी, इस तरह तस्वीरों को एक के बाद एक लगा कर कहानी पूरी करो''। जब बच्चा तस्वीरों को क्रम से लगा दे (सही या गलत) उसे उसी क्रम में रखा रहने दो। फिर बच्चे से कहो ''बताओ कहानी में क्या हो रहा है''। अगर बच्चे को स्पष्ट ना हो तो पूछ सकते हो बिल्ली क्या कर रही है, चूहा क्या कर रहा है''।

इस गतिविधि के दो पक्ष है। एक बच्चे की चिंतन–प्रक्रिया, दूसरा उसके अभिव्यक्त करने का कौशल इसलिये अगर बच्चा तस्वीरों को गलत क्रम में भी लगाता है तो इस बात का विशेष

ध्यान रखना होगा कि इस गलत क्रम में भी लगाता है तो इस बात का विशेष ध्यान रखना होगा कि इस गलत क्रम को वो कहानी के रूप में कैसे रखता है क्योंकि हो सकता है बच्चा अपना ही कोई क्रम बना कर उसकी बहुत अच्छी व्याख्या करे।

अवलोकन एवं रिकार्ड करना :

(a) बच्चा जिस क्रम में कहानी लगाए उसे नोट कर लो जैसे 1, 3, 2, 4, 6, 7, 5 या जो भी क्रम हो।

(b) बच्चा कहानी के बो में जो कुछ भी बोले उसे ठीक उन्ही शब्दों में उतार लो।

Notes :

1. Constuctivist view of learning refers to the ideas mainly expounded in the theories of Jean Piaget, Jerome Bruner and L.S. Vygotsky.
2. Luis C Moll (Ed) 1990 'Vygotsky and Education' Cambridge University, U.K.
3. Bodh Shiksha Samiti, 1996, Jaipur, India.
4. Reurenstein et. 1979.
5. Elliot, Lanchlan and Stringer, 1996.
6. L.S. Vygotsky.
7. Jerome Bruner.