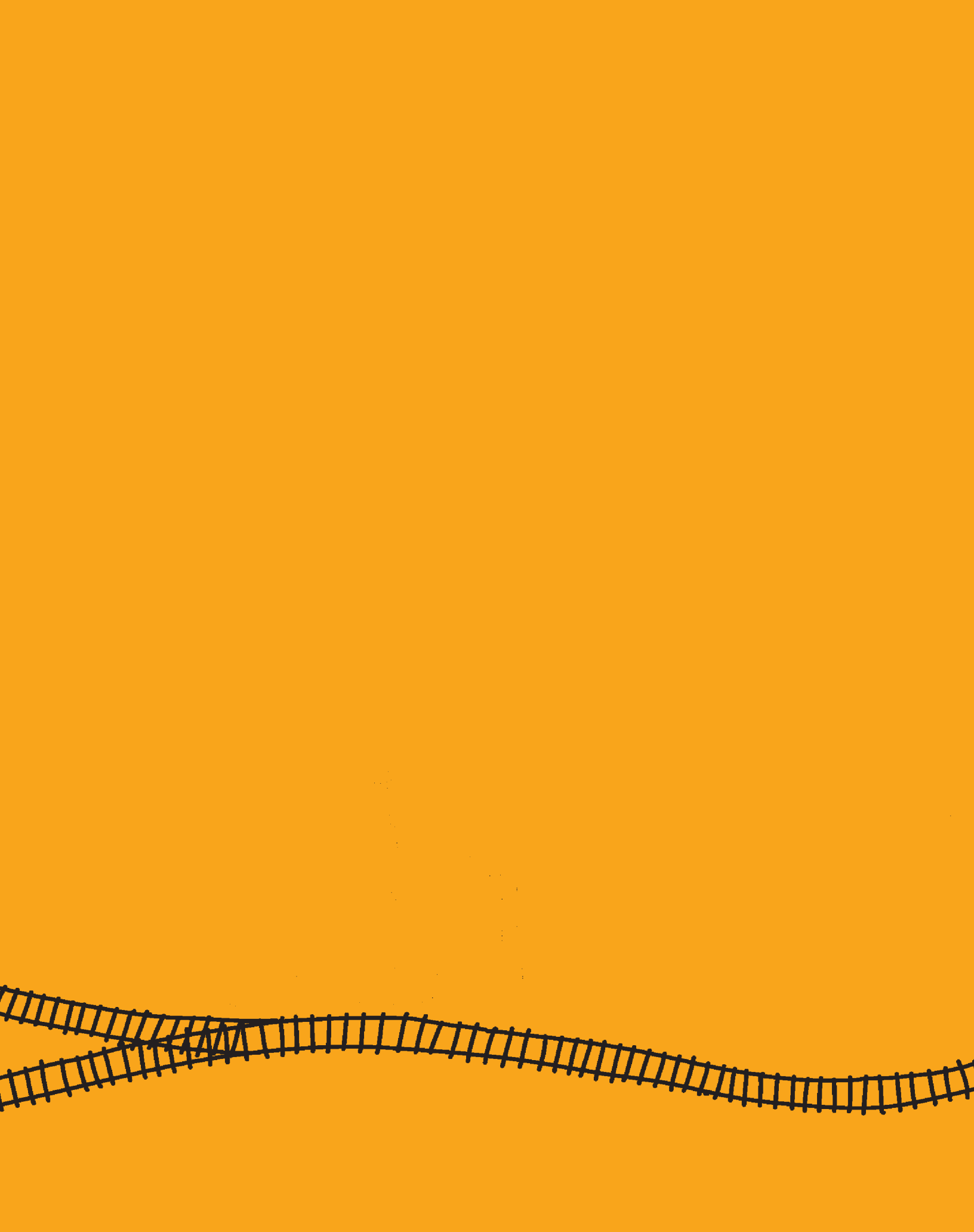
# Towards Joyful Learning

## Khelghar Handbook

2

Khelghar | Palakneeti Pariwar Publication



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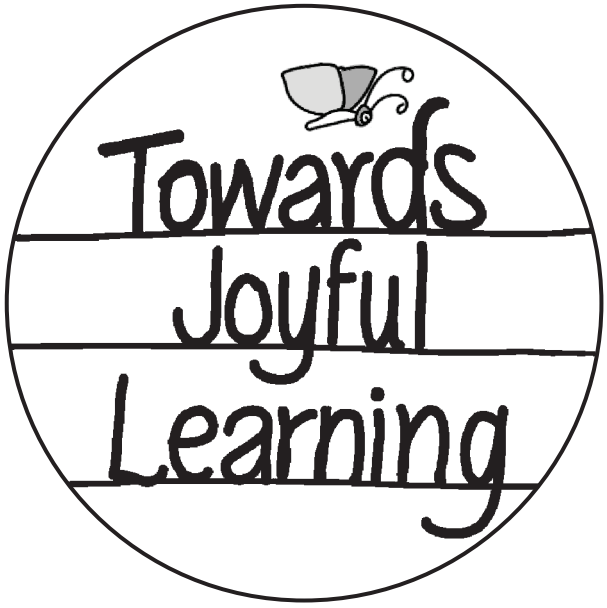


# Khelghar Handbook - 2

Palakneeti
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## Part Three



## Part Four

# Part Three

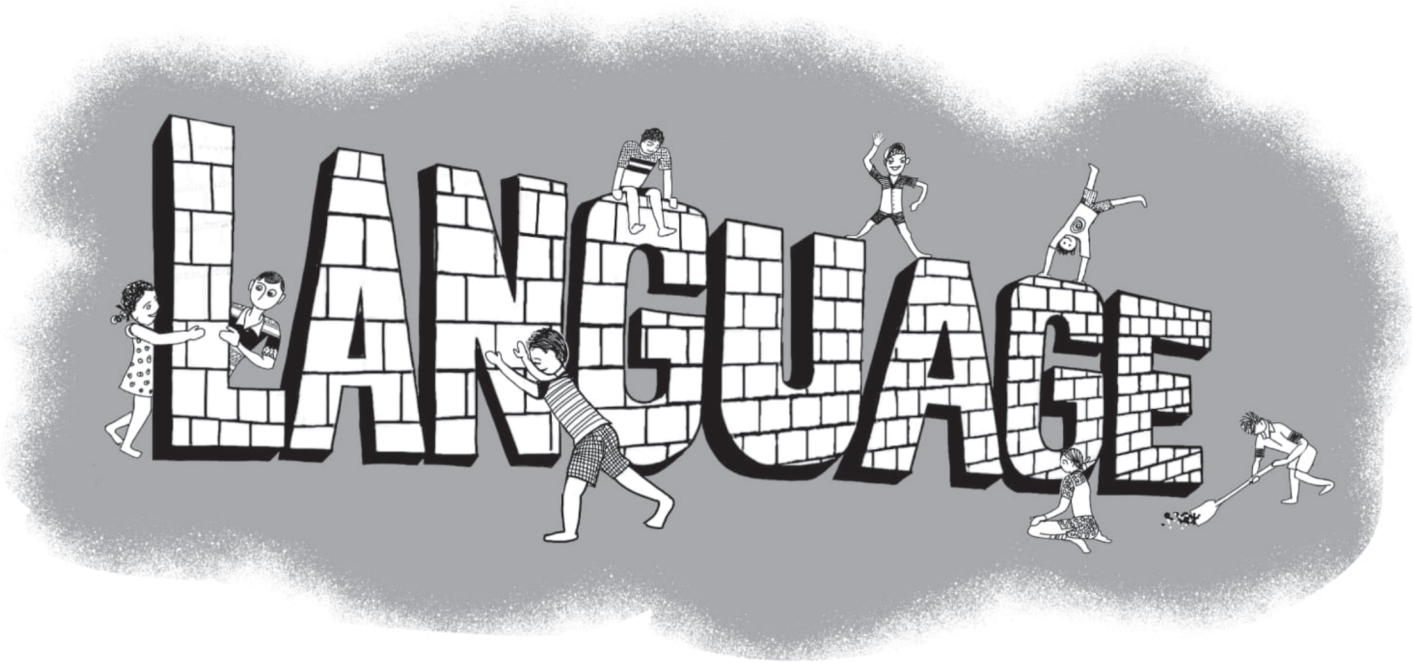
Khelghar activity is complementary to school. For children to feel the urge to attend school and to learn, it is necessary to bridge the gap between the realities of their life and what is taught in the schools. Due to time constraints, Khelghar cannot assume responsibility of the entire academic curriculum taught in schools, but it can try to ensure that children understand the basic concepts from curricular subjects.

This chapter deals with how linguistic skills such as listening, speaking, reading, writing and mathematical skills such as estimation, logical reasoning, numeracy and geometry can be developed through the activities of Khelghar. The chapter covers activities to be conducted for language and mathematics instruction, Khelghar's role for conducting these activities, the difficulties faced and their solutions. It presents how learning can be made effective by using various educational tools and connecting it to children's life and experiences.

Children's use of language is closely related to the things they do with their hands and bodies and the objects they come in contact with. Words and action go together in childhood. Actions and experiences create the need for words and words provide access to an experience after it is over.

With the help of words, children enrich their relationship with the objects they come in touch with. On the other hand, words without action or contact with objects remain empty and lifeless for the child. Words like 'cat', 'run', 'fall', 'blue', 'river' and 'rough' mean very little to the child unless these words have first been used in a context where the child was actively involved with the object or in an act. Only after such involvement do these words become associated with an image and become available for meaningful use in future.

**Krishnakumar**
From
The Child's Language And The Teacher




## On the path of "Language"

While working for and with children from the underprivileged sections of the society, certain thoughts and realizations persist in the mind. One of the realizations is about the tendency of this section of the society to mutely accept everything year after year.

The persistent thought about why they accept unjust and oppressive practices, do not actively demand changes for the betterment for their children and their community and continue to meekly toil away is quite disturbing. One keeps searching for ways through which children can be empowered to overcome the limitations dictated by their deprivation.

This search leads to the realization that the conditions faced by the underprivileged are multi-dimensional and complex. Financial, social and cultural dimensions are intertwined. Language development is one of the paths that these dimensions lead us to. Navigating this path brings about an expansive outlook within children. New horizons become visible to them and they develop a cognnisance of the self and their surroundings.

Children's language and their sensitivity towards language should be enriched, especially at a child-centric place like Khelghar. This will not only complement children's academic learning, but also provide benefits - such as bringing about positive changes in their personality - that are associated with having a command over a language. We will discuss further about how having a command over any language helps in personality development in multiple ways.

That language shapes the child's personality because the child lives and grows up in the environment that language creates. To this environment, the teacher makes a significant contribution.
If the teacher is sensitive to the various functions of language in the child's life, she will be able to respond to the child's intellectual and emotional needs.

**Krishnakumar**
The child's Language
And The Teacher

It is important to understand the social and linguistic background of the children attending Khelghar. There are three main things to note here -

Firstly, children might speak a dialect that is different from the 'standard' language.

Secondly, underprivileged children have not had enough opportunity and freedom in their childhood for experiences that are essential for language development. Even children from the privileged section of the society do not get enough freedom for such experiences. Adults are afraid that children might break things, spoil or spill and make a mess that the adult will have to deal with. Hence, adults discourage curiosity within children who want to handle things for themselves. It is rare to find an adult who understands the novelty with which a child is drawn to things like sifting flour through a sieve, drops of water dripping through the tap, a stray ray of light that slips through the window or the rhythmic sound of flattening a "bhakri". Children miss out on these experiences and countless opportunities for language enrichment are lost.

Thirdly, majority of the schools that the children attend, equate language instruction with merely rote learning of textbook lessons and answering the questions that follow. Teachers not only look down upon the dialectic language spoken by the children, but also express negative opinion about families who speak that dialect. As a result, the process of language development suffers and remains half-baked. It affects learning of other academic subjects as well. A feeling of inferiority with respect to one's language, self and family is instilled in the minds of children.

Language holds a unique place in everybody's life. It is closely related to one's existence, self-image and identity. Language is an irreplaceable part of our professional, emotional and intellectual life. We use it quite easily, everywhere and all the time. In fact, we use it so unknowingly, that we are not even aware of its usage. Each one of us, be it rich or poor, urban or rural, has his and her own language.

Once we acknowledge that the children attending Khelghar also have a language of their own and that it plays all these roles in their life, we can begin to understand what measures should and can be taken at Khelghar for language enrichment. When we learn to look at a language from various angles, we will be able to find solutions to the questions that we face while working with children. One will not only be able to conduct the suggested activities in a more effective manner, but will also go further to become resourceful enough to think about how to respond to different situations and will become equipped to address questions that cannot be answered by referring to any book or website.

## What is language?

To understand a language, we need to start from the roots of the word 'language'. It derives from the Latin word "lingua" which means tongue, relating it to speech. Language has developed through speech. Speech is the core of any language. The script came into existence much later. When we speak, we make "meaningful sounds". People speaking a certain language have a common understanding about what a set of sounds means and that is how they understand each other. Every language in the world has infinite associations of specific sounds with their meaning. Language is a system of such associations or signals. The signals associated with a language are easily assimilated by children while growing up in the community that speaks that language. Extra and focused efforts are needed when one tries to learn a language that is not one's mother tongue.

Associations of conventions about meaning and structure, already created in our mind while learning a language, can help or hinder in the creation of a new 'sound-meaning signal system' while learning a new language. There are certain conventions about pronunciation as well as symbols of the script. There are also certain conventions about relation between words and the sentence structure. Hence, while learning a new language, we need to learn the script as well as the rules regarding sentence structure of that language.

Our first connection with language is established through "listening". The fetus can feel the vibrations caused by the mother's speech. The child can hear the mother's and others' voices even before it is born. Listening and understanding what is spoken is the basis of language development and is the starting point for a child's language instruction. Even after the child becomes proficient in the language, listening and understanding correctly continues to be of importance.

## Language Development

The rate of development of a language is extremely rapid during early childhood. There is no formal teaching, curriculum, textbooks or examinations and yet children learn language very rapidly at this stage. Let us try to recollect the experiences and the sensory stimulations that children get, what happens around them, opportunities of observation and inspirations for language development that they receive. This handbook will help the reader understand key things that need to be done to keep children attending Khelghar motivated and interested in learning.

Children observe adults around them speaking and their speech has a reference of reality. People proactively speak as and when and in the manner necessary for the situation at hand. Children hear adults talk. This talk is never monotonous or artificial. Children understand that intonations are an integral part of speech and that they have specific meanings. Children hear many sentences, the words contained therein and word forms that connect words together. They observe how speech affects the listener and the circumstances. This helps to create a language-rich environment around the child that is conducive to learning.

This chapter will explain how an atmosphere conducive to reading and writing can be created for a child and how one can structure experiential language activities at Khelghar in that direction.

While conducting these activities, it is extremely important to understand that during learning and gaining expertise with a language, one should deal with children's mistakes with empathy and correct them gently. Children learn with enthusiasm when they receive motivation.

Spoken words are made up of sounds. When we speak, a chain of sounds is created and the word that is uttered vanishes into thin air. Writing consists of creating symbols on an available surface. Written symbols persist.

Surfaces like stone slabs, tree barks and metal sheets were used in the past to record words. Paper, computer screens, tablets and mobile devices are the surfaces used now-a-days. When children realize that symbols written on surfaces can be used

in lieu of oral sounds, they start to develop a relation with the written language. This chapter details how one can work with children for developing the relation between sounds and letters. The crux of the process is helping children realize that the sounds that we utter while speaking can be represented as letters and that writing is an extended form of speaking.

It is important that every child's experience, emotion, opinion and expression finds a place in the process of learning a language. Even if we speak the same language, all of us have a unique 'self- language'. It is lined with references of our personal experiences.

Language is enriched by reinforcing some concepts from the "self-language", clarifying and adding to existing concepts and understanding a few completely new concepts. Hence, the language experience in the classroom should be planned in such a manner that every student can participate in it. A lesson that prompts participation of maximum students not only becomes an enriching language experience, but also serves as a qualitative example of the constructivist approach to learning.

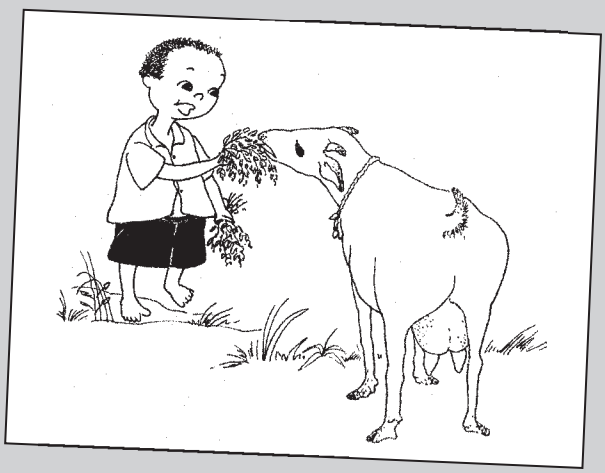
It is observed that examples of words used in language and vocabulary games or in practice lessons are primarily "nouns". Names of people, objects and places are often mentioned in such games. While nouns are an important part of language, the language becomes more meaningful through appropriate usage of adjectives, adverbs and verbs. Formal lessons and informal conversations at Khelghar should consciously place importance on the usage of such words. While reading books aloud, one should highlight how adjectives, adverbs and verbs are used in the book and point out different approaches to sentence structure. One should pause at phrases such as "cold voice", "cheerful morning", "light flowing through the sieve of the leaves on the tree", "tinkling of melodious memories" and provide the time and outlook necessary for children to understand the phrases and talk about them. "Cold" is something that we feel but using it for voice expresses something else. Water flows, but when we use this adverb for light, it helps paint a picture in front of our eyes. Memories do not make any sound, but why then would someone say that they are melodious and tinkling? Such conversations help develop sensitivity towards language and expand its compass.

The child needs to realize that sentences, words and exclamations spoken in the dimension of time can also be expressed through symbols in the dimension of space and that is "writing"!

**Varsha Sahasrabuddhe**
Palakneeti,
Diwali 2013

## Our stories : About Marathi - Pavri - Bhilori
**(Regional Language in Maharashtra)**

There is a dearth of children's literature in tribal dialects which do not have a script. The journey of learning the standard Marathi language, which is a medium of instruction in schools should be joyous and easy for children speaking other languages. This is the reason behind creating these books. Madhuri Purandare has illustrated these books. Some pictures from the books are given below.



Palakneeti Diwali Issue 2012.

## The effects of language development

Having a command over reading and writing has an intimate connection with self-confidence in social situations. This holds especially true for sections of the society that have not been traditionally associated with reading or writing and it is only their first or second generation that has received the opportunity for formal learning. Communication that happens through the written word in an educated society fails to reach this section or reaches them only through a mediator.

This deprives them of an important and huge source of information. Being dependent on someone else for information also breeds a sense of inferiority. This has a direct impact on self-esteem and confidence in social interaction. Hence, for children hailing from the underprivileged sections of the society, gaining an expertise with reading and writing a language has a deeper meaning than just language development. The meaning also reaches beyond the obvious advantage of securing a well-paying job as an adult.

In addition to the far-reaching advantages of language development, there are some immediate visible advantages. As discussed earlier, having a good command over a language makes learning other curricular subjects easier. When one gains expertise over a language by learning it as a 'subject', it becomes easier to learn other subjects using that language as a 'medium'. Learning and understanding curricular subjects such as history, geography, mathematics and science becomes easier and children's interest in these curricular subjects develops. Developed writing skills have an immediate positive impact on the grades of the child. Other children, teachers and parents now look at the child in a positive light. While it is true that exam grades are not all important, it is wise to acknowledge that in the current educational system, grades have the power to change the outlook with which other's view a child and that has a positive impact on the self-image of the child.

It takes time and patience to see observable changes in the children attending Khelghar, but once these changes start, their results have a ripple effect. The child not only ensures that she attends Khelghar regularly, but also sets an effective example for other children who need motivation for regular attendance. This also reaches parents in the basti and it helps in increasing children's attendance at Khelghar. The ripples of language development reach far and wide.

## Dialect and the Standard Language

Even years after migration to the city, the language of the children attending Khelghar is observed to be heavily influenced by native dialects, intonations and styles of speech. There is a tendency in the urban society to consider any dialect other than the standard language as inferior. There is a possibility that the volunteers at Khelghar, despite their genuine feelings for children might be subconsciously influenced by this attitude. They might harbor a misconception that speaking in a native dialect is an incorrect speech. Hence it is most important for the teachers at Khelghar to understand the concepts of dialect and standard language. One should always remember that the spoken dialect can be different than the standard language and that there can be no superior-inferior relation between these versions of the language. The standard language has been developed only to facilitate communication between groups that speak different dialects of the language. The standard language, in fact, stems as an amalgamation of various dialects from the geographical area in which it is spoken. It is important for expansive communication that everybody gains a level of expertise in the standard language. It is thus important that efforts should be taken at Khelghar for children to become proficient in the standard language, while ensuring that a feeling of inferiority about their dialect does not take hold in their mind.

Reading letters, their combinations and script symbols accurately is important in the journey from the dialect to the standard language. It is quite acceptable to insist on using the standard language in activities that involve a reference to the written material, such as reading. Answering questions on textbook lessons is an example of such activity. Activities that involve free thought and expression or creative writing can accommodate for usage of the spoken dialect. The focus of these activities is on the children's observation, their comprehension, thought and expression. In such writing activities, the spoken dialect can be accepted to foster expression, rather than insistence on using the standard language.

The teacher can make a list of common words from the children's dialect, write the corresponding words in the standard language and put this chart up in the classroom as an easy reference. This will help children remember the words from the standard language. Exercises and games can also be created using this list of words. This is how one can encourage and direct learning of the standard language by ensuring that an inferiority complex about the dialect does not linger in the learner.

## From language to thoughts

The concrete advantages of gaining expertise in linguistic skills such as listening, conversational, reading and writing are obvious. For example, being able to read price tags on packets, reading bus route information, newspapers, filling forms, being able to speak well and so on. But language development goes beyond these concrete advantages to create a deep impact on self-development. Thoughts are shaped through conversations with the self. The more mature the language, better is the ability for

There is a high probability that the day of the children attending Khelghar is marred by many stresses. Language plays an important role in reducing and alleviating this stress. The handbook has mentioned the importance of communication in detail. Children need to experience that words and language can help to alleviate mental strain through effective communication, reduce the intensity of their frustration and woes and prove effective in establishing a balanced, hopeful state of mind.

Children slowly realize that they can have a conversation with themselves even in the absence of a third person like Khelghar tai or dada. They learn to use language to shift their mind from restlessness to a calm and peaceful state. It is language that helps us to review and analyse various aspects of the state of our mind and use self-talk to overcome a state of bleakness and despair.

complicated thoughts. Developed linguistic skills help us to compare and contrast various possibilities at the abstract level of thought, without needing to act them out in reality and make predictions within each possibility.

The stronger the ability for thought, the higher is the possibility of a person to influence the situation at hand. The chances of positive experiences within the practical and the abstract personal sphere increase when a person gains the ability to shape the circumstances in the best possible direction. This increases the probability of developing a positive mindset about the self and the world. Good language, thus, helps alter the quality of our life.

Surroundings affect our life. Immediate as well as remote surroundings are closely related to a person's life. Language affects how precise and accurate one's understanding of the surroundings is. It aids effective understanding of the affairs between the people around us. It helps the process of becoming a mature person. One is often plagued by doubt or confusion and unknowingly, one's self-language acts as a guide in the journey from doubt to decision and confusion to clarity.

Once we realize the dimensions of a language, we can begin to understand that its role in our life stretches far beyond the four linguistic skills. This understanding naturally helps us to become aware of what needs to be consciously done at Khelghar for language development. By developing language, we help the child to become a capable, sensitive human being, who can face the realities of life with a positive outlook, raise her voice against injustice, demand and work towards changing the status quo.

**Varsha Sahasrabuddhe**


## Our heartfelt gratitude

The credit for shaping the language learning pedagogy at Khelghar goes to many people. Varsha Tai has been our primary guide in this task right from the start.

Her experiments with language instruction conducted at Aksharnandan school, the workshops she has conducted over the years for Khelghar volunteers as well as her timely guidance has shaped the language instruction at Khelghar. She has translated the book "The child's language and the teacher" by Krishna Kumar into Marathi, which helps us to develop our outlook towards language instruction.

Nilesh Nimkar from "Quest" has taught us a lot. We have included those learnings in the third edition of the handbook.

Books authored by Madhuri Purandare, namely, "Lihave Netake" and "Vachu Anande" have also helped us immensely. We have learned from experimental schools such as Seeta School (Bengaluru), Quest (Wada), Anand Niketan (Vardha) and Srujan Anand Vidyalay (Kolhapur).

All this has served as the foundation on which the learning experiences at Khelghar are arranged in the chapters that follow. The chapter starts from Varsha Sahasrabuddhe's article that details the outlook to language education.

## Approach for Teaching English as a Foreign Language (EFL) in low-exposure settings

The need for learning English is closely related with education, growth, self-esteem and professional opportunities. This need has grown in all sections of the society. English has been introduced in many state board schools right from the first standard. There are many challenges in making English language teaching and learning successful. The English language is quite remote from student's experiences and social settings. Most students have little or no exposure to the English language. There are very few teachers, especially in rural areas who have good fluency in English. There are even fewer teachers who are skilled in second and third language pedagogy. Students from low-exposure and economically disadvantaged backgrounds have no exposure to the language, other than the English textbook that they have to study in the school. The situation is challenging in English medium schools as well.

The traditional approach of EFL teaching focuses on translation of English texts into the local language, learning English words and their meaning and rote learning of spellings. This approach gives importance to learning the grammar structures, very often creating definitions of the grammar structures. In a nutshell, the traditional method in India for EFL teaching has been focused on the grammar aspect of the language. Schools, especially in urban areas, often have an 'English only' policy, where the learning of the language (and other subjects) occurs in the target (English) language. The use of their mother tongue is frowned upon. This method poses a risk of alienation of the learner and is quite unsuited in low exposure settings. Traditionally, the focus of EFL has been language 'learning' as opposed to language 'acquisition'. We will see the difference in these two terminologies below. These methods of teaching English as a Foreign Language do not help students learn English in their daily lives. They cannot use English for practical purposes. It is necessary to adopt a method in which the English language can be taught so that students can understand it and produce it for day to day communication.

**Language 'learning' Vs. 'acquisition'**

Children 'pick up' their mother tongue from their surroundings. They figure out how to use it to navigate their social relations and get their needs fulfilled. No one explicitly teaches them their mother tongue. Adults are also able to 'pick up' a language when the need arises. (e.g., living in a state that speaks a different language). This is called language 'acquisition'. It means development of language ability by using it in natural and communicative situations. The EFL approach in India has focused on language 'learning' rather than acquisition. Learning involves knowing the rules of the language. It does not necessarily focus on the communicative ability and is overly concerned about 'right' and 'wrong' way of putting words together. Language learners are so concerned about the correctness of their language while using it for communication, that they have great difficulty in keeping the conversation going. They subsequently stop participating in the communication. We see many examples of students who might very well be able to recite definitions of participles and conjunctions and ace their examinations but might not be able to write a simple application form!

We can closely examine the conditions and circumstances under which children acquire their mother tongue and try to apply some of these principles in the EFL classroom. This can help to encourage acquisition and to reduce the stress of learning English. The conditions under which children acquire their mother tongue include encouraging and stress-free environment and the need of understanding the language. Let us understand these a little bit more.

**1. Encouraging and stress-free environment**

When a child starts to produce her mother tongue by listening, doing, talking and experimenting, the adults around the child support this journey by being encouraging. They do not point out mistakes in speech, nor do they try to explain the rules of the language to the child. They simply talk to the child about what goes around. Children are not told off and neither are they concerned about talking 'correctly'. E.g., a child calls water 'pa', 'papa' or any such word. The adults respond by saying "You want pa? Here is some water." Adults show the maturity to understand what the child needs to say and they accommodate the child in their conversations. They also associate the words in the mother tongue with the child's talk and actual physical objects. This encourages the child to acquire the language further.

**2. Motivation for learning language**

Very young children who are acquiring the mother tongue have a strong reason and motivation to do so. Real physical and emotional needs of the child such as water, food, love, movement are fulfilled when they learn to communicate using the language that adults around them understand. This is the biggest motivation for learning a language. The purpose of producing a language is always communication. Language is best acquired when the focus of the language is on 'what is being said' rather than the grammatical structure of the language. This means that language is best acquired when it is being used to convey messages, not when it is explicitly taught for conscious learning. Children learn their mother tongue for the sole purpose of understanding what is going on around them and to communicate. They do not learn it for the sake of learning. All the input they receive in their mother tongue is for the purpose of comprehension.

These are the two biggest enablers in language acquisition. EFL teaching in most schools is just the opposite of these enablers. There is a great focus on speaking and writing 'correctly', there are corrections and reprimands for mistakes. The tasks given to students in the English classroom, such as writing a sentence multiple times, learning spellings by heart, repeating sentences after the teacher, have no real application in day to day life. They are simply boring. The focus of teaching is on the form and grammar rather than the application of the language. This is not a conducive atmosphere for language acquisition.

With this in mind, we can think of the following characteristics of a balanced approach to EFL teaching in the classroom.

- Plenty of 'comprehensible (understandable) input' with focus on understanding of the language.
- Using topics of relevance and interest to the learners.
- No forced production of language.
- Stress-free environment in the classroom.
- Systematic teaching of phonological awareness and phonics.
- Extensive reading

Let us look at these characteristics in detail.

**What are the features of a balanced, communicative approach to EFL?**

**1. Comprehensible input**

This means having plenty of audio and visual English inputs in the classroom. The more children get to hear and see the language, the more they can

learn to speak and write it. This can be achieved through activities given below.

**a. Songs and poems –** songs sung in simple tunes with actions are very enjoyable for children. Actions related to the words help in understanding the meaning of the words. Singing the songs helps children to practice pronunciations of English. E.g. Heads, shoulders, knees and toes, Hello Song, Five little monkeys, put your right hand in. Children should be encouraged to sing action songs in every class.

**b. Simple instructions –** Giving simple instructions in the classroom in English, such as 'Let us sit down', 'Let us stand up', 'Let us form a line', 'Bring your bags' etc with a meaningful gesture or body action can help children become familiar with common usage of the language. Teachers can aim to give 3-4 new instructions every week in this way. Children see the action done by the teacher while giving the instruction and figure out the meaning on their own. They soon start to use the instructions outside of the classroom as well.

**c. Classroom routines –** Writing down the daily routine on the blackboard, reading it out with children helps children to comprehend the relationship between the written and verbal language. Hello and Goodbye routines can also help children to communicate using English.

**d. Games –** Games such as 'Simon Says', 'Connect', 'Dumb Charades' provide a lot of understandable input in English and children participate without any tension in these games.

The input given by the teacher should be a little beyond what the learner understands. There can be a few new words every week. This new input is made understandable using body actions, pictures and gestures. It should be repeated often to ensure children understand and remember it. Words and phrases should not be explicitly taught but should be introduced through their application in the classroom.

**2. Topics of relevance and interest**

Children feel motivated to learn if the subject matter is of a topic that interests them. Same applies to the EFL classroom. Instead of going over lessons in the textbook, which might not be relevant or interesting to the children, we can use various topics and storybooks that children will better connect with.

Topics can be shortlisted by having a conversation with children. Teachers can ask children what they like to do, what they would like to know about. Children's responses will help the teacher make a list of themes for the English classroom. Some sample topics that can be used are–

- My home
- My friends
- What do I like to do? What do I hate to do?
- Cricket and other games
- Superheroes
- Movies and films, songs in films
- A book that children like

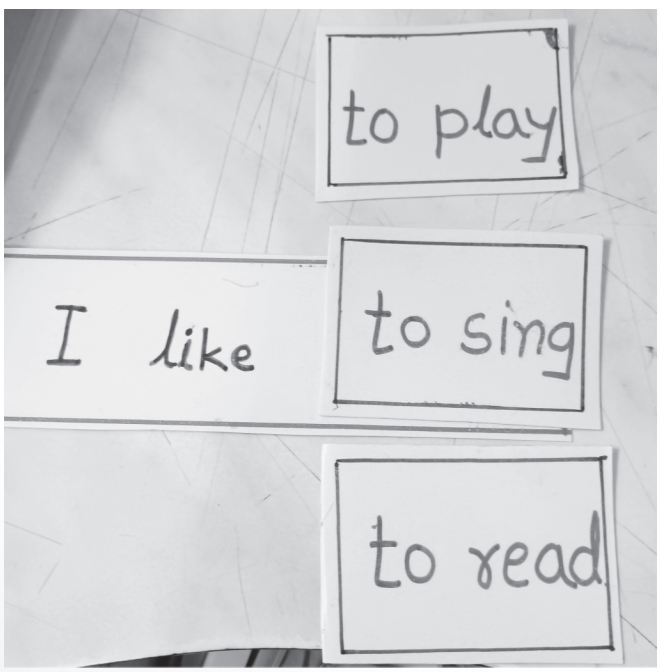
**3. No forced production of language**

It is stressful for children to be forced to talk in a foreign language. Since they are not comfortable talking in English, their efforts are completely focused on getting over their discomfort rather than consciously using the language. Hence children should not be forced to communicate in English. It is very natural for children to have a 'silent period' (Krashen, Terrell – The Natural Approach, language acquisition in the classroom) where they do not speak at all in the EFL classroom. In this period, learners are building their vocabulary and competence of the language through listening and understanding. Slowly they feel the confidence to verbally produce the language. Their speaking might have errors, but it is important that the teacher does not point those errors out explicitly. The confidence that the child has started to gain for speaking in English is more important than having error free production.

**4. Stress-free environment**

Learning happens best when children are free from any stress. In low exposure settings, children might already have a barrier towards English. Hence it is very important that they do not get stressed about trying out English in the classroom. A child who is stress free is more open to learning the language and hence will learn better.

To achieve this in the classroom, the lessons should be structured in a way that children have the choice and opportunity to explore the language at their own pace. They are not afraid to make mistakes and teachers do not keep correcting their production of the language. Group work is a great way of encouraging participation and reducing anxiety as it avoids the feeling of 'being in the spotlight'. The teacher can also use the mother tongue or the local language to explain certain aspects. This helps the child to understand the concepts better. Care should be taken though not to translate each and every thing in the local language. Children soon stop listening to the English instructions if they know that everything will be translated by the teacher into the local language.




**5. Phonological Awareness and Phonics**

The crux of language lies in the realization that verbal and written language are one and the same. We can speak exactly what we write and we can write exactly what we speak. This boils down to realizing the sound-symbol relationship in a language. Children need to be explicitly taught this relationship in EFL. This is the basic step in teaching English reading and writing.

Difference in phonics and phonological awareness.

***Phonological awareness*** means understanding the sounds in the language. Being aware of the sounds in the language, being able to separate them, delete them and substitute them are the basic skills in learning a language. E.g., being able to break a word into syllables, (tiger = ti + ger, elephant - e + le + phant, umbrella = um + bre + lla). Deleting a syllable from a word (if we remove 'ti' from tiger, we have only 'ger'). Substitution of syllables ( in the word monkey, if we remove 'mon' and add 'don', we get donkey).

These are some examples of phonological awareness. Having strong phonological awareness helps to attain reading proficiency. It helps us in decoding words quickly. Readers who can decode quickly without effort can invest their attention towards comprehension, i.e. meaning making. Children who lack phonological awareness have to put more effort in decoding the words and hence are left with no bandwidth to focus on the meaning making part of reading.

***Phonics*** refers to the sound-symbol relationship. E.g., sounds of each letter in the alphabet (b says '/b/' etc.) and sounds of letter combinations (ch, sh, oy etc.). Phonics refers to printed text whereas phonological awareness is about oral language.

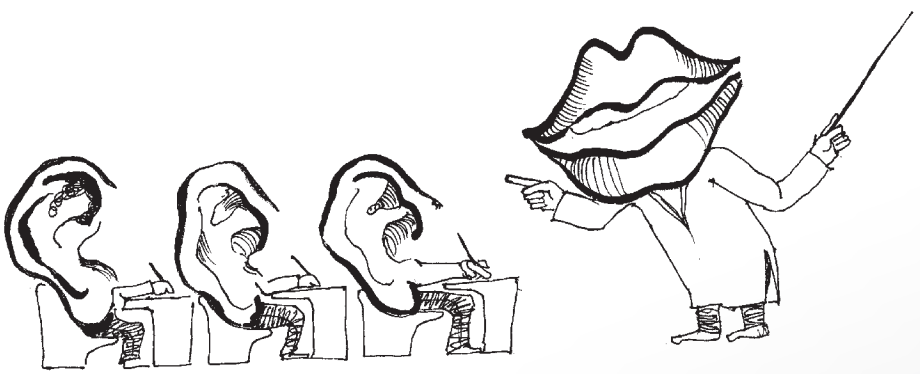
**6. Extensive reading**

a. Reading of books that are at the current level of reading ability
b. Read aloud of books (using MT)

# Listening and Speaking

A conversation with the Khelghar Tai

Listening and speaking are important skills for language development. The development of reading and writing skills requires a strong foundation of listening and speaking skills. While listening and speaking seem to be quite easy and straightforward at the outset, there are many intricacies involved in them. If we want to listen carefully to what someone says, we must learn to rein in thoughts that tend to flow in all directions at the same time. This is nothing but 'concentration'. While listening, we not only hear the words, but also make sense of the expressions and the intonations of the speaker, to create meaning from what is being said. Then we think of what has been heard and try to speculate about what has not been fully understood. We wait for our turn patiently and respond by speaking in an appropriate and relevant manner.



With thanks from Danger School

Some things for adults to remember while speaking with children:

- A child learns a lot when she speaks.
- Let the child complete what she wants to say.
- Show interest in what the child wants to tell you.
- Refrain from negating what the child says.
- Go beyond responding with 'good', 'wow' or 'not like that', to include more details and employ rich sentence structure in your responses with children.
- Ask for more information. Share experiences and show things in a new light.
- Ask their opinion about things that make you wonder.
- Observe with children, find references, sketch drawings to enhance your learning together with children.

**Krishna Kumar**
– 'The child's language and the Teacher'.

For the listening and speaking process to happen smoothly, it is necessary to know the structure of the language, have sufficient vocabulary, be able to think with clarity and be able to speak one's mind.

Our goal is to work with children on all these skills. Underprivileged children face many challenges while learning a language.

- Different languages are spoken at home and at school.
- Teachers may not be aware of other languages being spoken at the home.
- Parents spend most of their time out of home for work and hence children do not get enough opportunity to converse with them and hence language development suffers.
- Underprivileged children face insults from the society on account of their language, hence they are afraid to speak.
- An inferiority complex about the self-image and self-esteem breeds in their mind because their dialect is not recognized in the school.
- Due to the lack of quality early education, these children do not get opportunities for language development. They are not introduced to the written language.
- A 'be quiet' atmosphere in the classroom makes the child shy away from speech and she gradually stops listening as well.

A child who has been through these experiences, comes face to face with language as a medium of instruction, when she starts to attend formal school at the age of six. The language in the school is different from what is spoken at home. Let alone language skills, the

child does not even understand what is happening in the classroom! The foundation of learning remains weak in all aspects.

When children speak with each other during the class, it is interpreted as their disinterest in learning and they are asked to 'keep quiet'. Adults endlessly preach and instruct.

When exposed to frequent instructions, preaching and criticism, children soon master the craft of selective listening! It becomes their habit to react impulsively, without listening carefully.

Listening and speaking are the fundamental tools of teaching in primary schools. Children who have not had enough opportunity for expression, lag behind in the classroom. They do not interact with other children. Since they do not know how to listen carefully, they are unable to respond to their teachers and classmates. As a result, such children do not feel interested in school.

Children who attend Khelghar come with such past experiences. The free environment in the classroom, respectful and trustful interactions with the teachers makes them hopeful about Khelghar. If the child's language is very different from what is spoken in the school, the teacher should consciously learn a few words and sentences from the child's language. This will help to reduce the language barrier and children will be motivated to learn the standard language.

## Games and activities in the classroom

There are some activities that can be conducted to encourage frequent and meaningful listening, thinking, responding and speaking in the classroom.

The experience of someone paying attention and listening with interest to what they say is very inspiring for children. It is advisable that special time be allotted for free chat, preferably in the early hours at Khelghar. This will encourage children to attend Khelghar at their own free will and increase their participation. Please refer to pages 88-89 under heading 'Befriending Children' in Volume 1 of the handbook for stages in communication.

## What can be done to encourage active listening?

- Play audio songs and stories. Children will learn about clear speech, pace and intonations in speech through this.
- Record and playback of children's voices. This will help them understand their pronunciation and challenges in their speech.
- At Khelghar, sing songs, rhymes and action songs that children enjoy.
- Play listening games.
  Invite the children to spread throughout a large

### For children to speak freely…

Obstacles in speech can be overcome when the child experiences that adults are listening carefully to what the child is speaking and that they genuinely want the child to speak.

- Ensure that children often get the opportunity to talk about themselves and their experiences. Conversations about curricular topics can also start with children's experiences.
- Children should be given the opportunity to talk about their favourite persons, animals, birds, books, etc.
- Encourage children to observe and talk about living and non-living things around them.
- Take the children on outdoor excursions and talk to them about what is seen around.
- Use pictures, advertisements, books, movies, exhibitions, festivals and celebrations as occasions to encourage conversation with children.
- Communication is of utmost importance for getting participation from children in the teaching-learning process. The teacher can discuss the guidelines for teaching and learning, planning of sessions, distribution of work, evaluations, etc. with the children, so that children feel encouraged to speak freely and the doors to communication open.

open space. Instruct them to walk when you say "Walk" and to stop walking when you say "Stop". Give a series of these commands randomly. Children are bound to make mistakes and then realise and laugh about it.

## Rhythm Games

It is fun to say a particular word or sentence in different rhythms and voices. In addition, listening carefully is necessary to reproduce the rhythm/voice exactly like how the Tai says.

In this game, the children respond by imitating the note, rhythm and voice after the Tai.

Tai – Gulabjamun, Gulabjamun!

Children – We won't eat, We won't eat!

Tai – Why won't you eat? Why won't you eat?

Children – It's not sweet, it's not sweet!

The Tai changes her voice, rhythm and speed, slowing it down and or quickening it and the children imitate her.

## Storytelling

Stories can be told to a small (2-3) or large (40-50) group of children.

Stories are a useful tool to foster a free and fun environment in the classroom. There should be frequent storytelling sessions at Khelghar. Listening to stories helps children understand creative use of language.

Selection of the story is very important. The story should be interesting so that the children can be engrossed in it. The characters should be such that the children can relate to them. It is wise to refrain from stories that preach morals. The Tai should arouse curiosity about the story among the children before narrating it.

Storytelling is an art. It is not as easy as it seems. Here are a few pointers that will help Tai learn how to tell stories.

- The seating arrangement should be such that the Tai is easily visible to all children.


Storytime at Khelghar

- Tell the story with expressions and dramatisation/actions.
- Tai should have read the story multiple times before narrating it in the class. She should have practiced the intonations and expressions to make the story more interesting.
- Her voice and dramatic skills should hold the children's attention. Her pronunciation should be clear.
- She should enjoy the story as much as the children. She should elicit participation from the children.
- Stories are great opportunities to introduce new words and phrases to children. She should point such words out and write them on the blackboard.
- Tai can relate the story to the children's experiences or explain meanings of new words by giving examples, but should do so sparingly, else children can lose interest in the main story.
- Tai can stop the narration midway and ask the children to complete the story.
- Stories that children enjoy can be narrated over and over again.
- One should definitely have a conversation with the children after narrating the story, but "What did you learn from this story? / what is the moral of this story?" are the questions best avoided! Questions such as "What happened after so-and-so incident" that kind of testing children should also be avoided. If the children fear that they are being tested on the story, they cannot immerse themselves in the story to enjoy it fully. Instead, the conversation should focus on what they felt while listening to the story or what experiences could they relate it to. Children should be encouraged to do activities such as changing the story line, imagining a different ending and suggesting different names for the story.
- One can also tell stories related to the lessons in the textbook. For example, the lesson about Indus Valley Civilization can be presented by the children with help of Tai in a story form. This will help children to develop an interest in history.
- Children can present a story in a group.
- Children can make a list of questions about a story.
- Children can present a skit based on the narrated story or can make some changes in the story and present their skit.
- Imitate characters from the story.
- Each child adds one sentence in sequence and the whole group creates a story. Children's participation adds flavour to the narration!
- Children can sketch drawings about their favourite story and put up an exhibition of their drawings.

Listening to the sounds in the box….

**What does storytelling achieve?**

- Children enjoy listening to stories. They start to concentrate while listening.
- Their vocabulary increases, thus expanding the exposure of their language awareness. It helps them befriend and enrich the language.
- Children get to know meaningful words and sentences through stories. This helps increase language skills and children begin to understand the structure and rules of the language.
- Incidents, ideas and experiences from the story help to expand the imagination and thinking of children.
- Children can experience the importance of relationships and emotions therein through the imaginary world of stories.
- Children start to predict what will happen in the story next. Presenting these predictions to the group helps to build their confidence.
- The importance of some core values and habits can be easily conveyed through stories.
- While listening to a story, one pictures it in the mind and visualizes the sequence of events. This develops imagination.

- Most importantly, children engage with the story at an emotional level. This helps to create a positive, communicative, trustful and encouraging environment within the group.

## Some games for active listening

### Game of Silence

This game can be conducted to help children concentrate, become peaceful and be physically and mentally present in the classroom.

Tai gives appropriate instructions at the start to ensure that the classroom is quiet. Everyone, including the Tai, sits quietly for a few minutes with their eyes closed. Everyone listens to the sounds around them consciously and tries to remember them. Tai asks children to open their eyes after a few minutes. Starting from the child who is usually quiet in the classroom, Tai asks each child about the sounds they heard.

There is variety in the sounds. Someone might talk about a sound from the classroom, someone else about a bird's song they might have heard. If a child is not able to name a particular sound or is unable to recall, Tai helps him to remember and name the sound. Children will have various levels of listening, understanding and recall. This game will enable children to slowly begin to sit in one place, listen carefully and describe sounds using right words.

### Sound boxes

Take 7-8 small non-transparent boxes or bottles. Fill them with objects that produce sounds, such as small stones, pieces of glass bangles, sand, marbles, coins etc.

Children shake the box to hear the sound that it makes and guess what is inside. They need to listen intently and think while guessing. It is a lot of fun when they guess correctly!

### Funny instructions

This game helps to check verbal comprehension and whether children can act according to oral instructions. It also provides listening practice. Tai gives instructions such as - "crawl like a snake", "jump", "run to the door and open it", "hop on your right leg" – and the child acts accordingly. Other children verify whether the instruction has been implemented correctly and help the child if needed. More complex instructions can be included later. For example, "hold a pencil in the left hand and keep it in the right drawer of the table." Some children understand the instructions immediately and some need to be told more than once. This helps Tai to understand whether children need help with the task. Children who cannot perform according to the instruction need more help with their listening and oral comprehension skills.

### Listen and create a composition

Two children sit with their backs to each other. Each has a pencil and a piece of paper. One child draws something and explains in detail what he is drawing to his partner. For example, "I have drawn a horizontal line at the top of the page and then I have drawn a circle of the size of a bangle at the center."

The second child draws exactly as per the instructions given by the first child. This activity involves detailed explanation of actions by the first child and attentive listening and execution of those actions by the second child. Due to its challenging nature, this activity requires great focus and is very engaging. This activity can be conducted using pieces of coloured paper or various shapes as well. Both children receive the same pieces or shapes and they make a composition out of it. It is observed that making a composition is easier than making a drawing.

### Communication using body language

We use our eyes and expressions in addition to words while communicating. Our emotions and opinions are conveyed through our body language. This activity can be used to help children realize this and enable them to use body language in their communication effectively.

- Make pairs of children. One child enacts a sentence without speaking and the other tries to guess the sentence.

- One child asks the other to perform an action without using words and the other child guesses and performs the action.

- One child enacts an emotion and the other child guesses the emotion.

- Tai enacts a story without words and the children verbalize what they have understood.

## Recorder

Make groups of four children and appoint a recorder in each group. Each group visits a different place nearby. There are different sounds to be heard in different places such as the street, the shop, the pond etc. The group hears and the recorder notes down these sounds in a book. After 10-15 minutes children return to the classroom and the recorder reads out their group's recording. If the group is unable to find the right words for the sound, they can explain the sound and others can help them find the right vocabulary. This activity helps with attentive listening, note-taking and learning onomatopoeic words.

## Simon Says

Everybody stands in a circle. Tai gives instructions at the start of the game – "Simon is our leader and so we will obey only Simon." She gives instructions such as "Simon says jump", "Simon says walk like an ant". Only one instruction is given at a time. The children listen to what Simon says and act accordingly. Tai can also give the instruction without starting it with "Simon says". For example, "run", "sit", "hop like a rabbit". She can also say "Reena says" instead of "Simon says". If they are not listening attentively, children perform the activity even if it does not begin with "Simon says". Tai can alert the children those who miss the instruction to listen to her carefully and give the instructions again. The aim of this activity is to develop children's listening skills. Children can create a habit of listening to the instructions while playing and act accordingly.

## Listening and narration

Listening attentively, remembering and narrating.

Time – 20 minutes. Age – 6-9 years. No. of children - 15-20

Choose or create a small paragraph.

For example – "Raju went to the shop.

He bought two mangoes.

The shopkeeper gave him the change.

He ran home and gave the mangoes to his mother."

Tai should read the paragraph loudly and clearly to the children.

Chatting with children while making words from the letter cards

Children listen to the read-aloud quietly. After the read-aloud, the children are given a few minutes to recall the whole paragraph. Now children narrate the paragraph. They try to keep their narration as close to the original as possible. If the paragraph is a little difficult, Tai reads it twice before asking the children to recall it. She also writes important words on the blackboard. Children with developed listening, comprehension and recall abilities are able to remember the paragraph correctly. Children whose skills are not yet developed benefit from the practice. This helps increase their confidence. Words, sentences, situations and songs can be chosen based on the level of children's linguistic skills.

Some activities for developing listening and speaking skills have been covered in this handbook.

1) Curiosity corner – Volume 1, pg 190. Conversations about something that ignites children's curiosity.

2) Steps in Khelghar project – Volume 1, pg 88-89. Befriending children, adding play, fun factor for the day, practical activity.

3) Dialogue about a particular topic – Volume 1, pg 79-80. And Volume 1, pg 112 – chit-chat to conversation

4) Games and activities based on observation – Volume 1, pg 191-192

5) Using objects – Volume 2, pg 256

6) Picture reading – Volume 2, pg 241-242

7) Book reading – Volume 2, pg 244.

## Teaching children to ask questions

Tai should have a conversation with the children about asking questions. She can give a few starting points for the discussion such as - What are questions? Why do we ask questions, whom do we ask questions?

Children should be introduced to 'Wh' words. Children can create questions starting with Who, Where, When, Why and How.

- Create various questions from a single sentence. For example, "Raju did all the household chores yesterday." This sentence can lead to questions such as "Who did all the chores yesterday?", "When did Raju do all the household chores?" and so on.
- Place an object before the children and tell them to ask questions that come to their mind while looking at that object. For example, the colour, the usage, the shape and so on.
- Think of questions that can be asked to guests of Khelghar.

## Answering children's questions

Once children start asking questions, Tai should try answering these questions with enthusiasm. If she does not know the answer, she should try to find them out. If it is not possible to find the answer immediately, Tai should find the answer and inform the child about it later. This will encourage children to ask more questions.

## Asking "good" questions

It is usually observed the questions asked in the classroom are intended to test children's memory. We expect children to remember only a few specific things. Learning goes far beyond this. Hence, it is important to try to ask questions of various types, that children might not have thought about. It is equally necessary for Tai to possess the skill of accepting children's answers with an open mind and taking the topic ahead accordingly.

We should try to ask questions that enhance the child's thinking process. A question can be about testing the memory or it can also demand the listener to think at a deeper and more complex level.

For example – "How many hours does your mother work from 6 am to 10 pm?" This question is about Maths but also prompts sensitivity about the mother's workload.

From the answers received, it is possible to gauge how deeply the child has thought about the issue. If the answer is superficial, one can ask further probing questions to encourage the child to think deeply.

Listening attentively, understanding what is being said and referencing it to state one's opinion is a very important communication skill. Conscious efforts taken in the pre-primary and the primary classes to develop this skill, go a long way in awakening the sensibilities of children.

## Awareness of the language

Children start learning a language right from their birth. There is an independent center for language learning in the child's brain. The child gradually imbibes the form, rules and structure of the languages spoken around her and continues to try to derive meaning out of it at her own level.

The child hears various sounds from birth. Slowly she begins to find meaning in the chain of sounds. She begins to imitate the sounds that she hears most frequently. Gradually she begins to find meaning in those sounds. This is the natural process through which the child learns to listen, understand and speak.

She gathers some experiences about the written script from the surroundings. She realizes at a subconscious level that the "chain of shapes" seen in written instructions, banners and advertisements is related to the "chain of sounds" that we produce while speaking.

If there are adults around the child who read and write, who read out to the child and if writing material is available at hand, the child begins to write as well.

This can be just scribbling to start with. Gradually the writing starts to include shapes from the script, symbols and punctuation marks from the written script. Realization of the structure of language at a subconscious level is called 'Emergent Literacy'. It is a modern way of viewing language education.


Making Sentences

The traditional method through which most of us have learnt language, assumes a limited meaning of literacy as 'the ability to read and write'. This new outlook incorporates various skills that the child learns before learning to actually read and write.

Awareness about the language develops gradually in the child's mind. It develops at two levels.

**1. Print awareness**

**2. Phonological awareness**

Awareness of these levels develop to some extent by the age of six. The child starts formal schooling with this foreknowledge. She does not come to school with a clean slate. Children who come from homes that have an environment of reading and writing and children who attend kindergartens that teach creatively with this new approach, learn to read and write quickly and joyfully.

But children of lesser educated parents neither receive a conducive environment at home, nor do they get to attend quality kindergartens. Hence, underprivileged children are often seen to fall behind in reading and writing.

According to the traditional outlook, a child starts to become literate only after she attends kindergarten or Grade one. Language pedagogy in schools assumes that 'for the child to start reading and writing, she should be first taught the alphabet, made to learn spellings by heart and made to practice writing them over and over again'. Our language education in primary schools is based on this premise. It does not relate much to the emotional world and practical daily life of the child. This journey from alphabet to meaning is quite time consuming. Immediately after starting school, if children are made to do uninteresting things such as practicing meaningless shapes and learning spellings by heart, their interest in education naturally declines.

This situation is changing in the past few years, but the hold of the traditional language pedagogy is still strong on the teacher's mind.

Underprivileged children suffer a lot because of this approach. Sometimes, the language they speak at home is quite different from the standard language used in school. Sometimes it is a dialect of the standard language. Pronunciations, words and meanings can be quite different. The child tries hard to cope up with the difference between the language followed in the school and the one spoken at home. In addition, the foreknowledge of the child is not taken in to account in education at school, hence the child starts to fall behind. She continues to face problems with reading and writing even though her age and comprehension level grows. Children who cannot follow the script at a basic level might even have to leave the school. It is important to understand the new approach to language learning and the outlook behind it if this situation is to be avoided.

The child learns language naturally before coming to school. Our aim is to continue this thread of learning and connect the logical aspects of script and grammar with it to give impetus to her language development.

In the new approach, we try to relate language learning to the child's emotional world and surroundings. The child's emotional world means the way the child views her life! Examples, books, situations, experiences and songs used in teaching language should be related to the emotional world of the child. That is when the teaching and learning will flourish.

To connect the comprehension of language that the child has developed since birth, through the use of language in her surroundings with the technical aspects of script introduced in the school, some of the following activities can be conducted in kindergarten schools. For the underprivileged children, who have not had access to quality

kindergartens, these activities should be conducted in grade one.

**1) Understanding the written language**

The realization that written matter holds some meaning is the beginning of understanding the concept of written language. Books contain words and letters, which have some meaning. There is a way in which this meaning can be understood. Understanding the rules about this, means developing the awareness of written language.

This is the first encounter of children with the written language. We should try to make the children realize a few necessary rules of the language at this stage. For example, English or Hindi is written from the left to the right. One starts from the left again after each line. There is some space between two words. One pauses for a bit after ending a sentence. One turns the page after finishing the text on that page, etc.

It is essential that all children in kindergarten and grade one receive a language-rich environment through the following activities -

**Print rich environment**

There should be a lot of written material displayed in the classroom for children to see. The text should be something that children will enjoy and can relate to. Moral sayings and bookish text should be avoided.

*Instructions for children –

"Let us keep our slippers in a line", "Let us throw trash in the dustbin" etc.

*Names of objects can be written on paper and stuck on the actual objects in the classroom. For example, blackboard, reading corner, library etc.

*We can create posters such as attendance chart, songs, timetable and birthday wishes and stick them on the walls -

Time should be allotted at the start of the class to attract children's attention to this text and read it out for them.

**Being around books**

Children who are exposed to a lot of books from childhood are seen to have a well-developed sense of the written language. We should try to fill this gap in underprivileged children's lives. Our classrooms should provide the opportunity for children to be surrounded by books.

Small and attractive picture books are a great help in getting children to befriend the script. Children can guess the story using books that have a lot of pictures and very little text. This helps them to realize that whatever we feel and speak is written in the book as we see these pictures.

Children explore books, they create stories from the pictures even if they cannot read the text, they draw pictures, talk about books with each other. Tai should read books aloud to children at this stage. Reading aloud while eliciting active participation from children is called 'Participatory Reading'.

Some important points in the process –

- The book should be held in a way that children can see it clearly
- Information about the author, illustrator, cover page should be given at the start
- Place where this information is written should be pointed out
- Children should be encouraged to guess the story based on the title and the cover page
- While reading aloud, Tai should also point out things like spacing between words, full stop / pause after sentence completion.

- She should also show that the text ends at the right bottom corner of the page and resumes from the left top corner on the subsequent page.
- Meaning of difficult words should be explained. Such words should be written on the board and practiced.

Children should be encouraged to think and ask questions during and after the 'read-aloud' session. They can be asked to check if their initial prediction about the story (made after seeing only the pictures) was in line with the story that was read out. Reading books aloud helps children to create familiarity with the written language and accept it. They easily understand the rules of the language.

Choice of books is very important. Children enjoy books that they can relate with. Books that have lots of colourful pictures, a little text and easy to understand content should be chosen at this point. ('Pratham Books' has published many such books. Children love books by Madhuri Purandare) Books read aloud by Tai should be kept in the reading corner for children to explore further. Since the books have already become familiar, children like to see them again. They try to guess the words and to read them as well. A single book should be read four to five times during participatory reading.

Children learn it by heart and start to gain confidence that they can understand the script and can read. They become motivated to read. They should be encouraged to draw pictures based on the book and tell the story to the class. Enactment is also a recommended activity.

## Writing for children

This activity should be conducted often for children who do not have script awareness and have not started to read or write yet.

Children share their experiences and Tai writes them on the blackboard. For example, Tai has brought a few things with her to the class. She shows a dried leaf to the class and asks what it is. Children say 'leaf'. She writes the word 'leaf' on the board. She further asks questions like "What is the leaf like? Where might I have found it? Why is it dry?" and writes children's answers on the board.

Children understand many aspects of the written language through this activity. For example, how the spoken word is written using a script, text is written from left to right and so on. Tai can ask children to draw and then have a conversation about those pictures. She can write the name of the picture and what the child thinks about it. Such activities help in developing awareness about the written form of language.

## 2) Awareness of the sound in speech

We talk to ourselves in our mind when we write. Writing is another form of speaking. The sounds that we make are represented with some symbols, which we call as script. We use the script to write. We write words separately, but we speak without taking distinctive breaks between words. Sometimes we join words together when we speak. For example, "It is alright" can be heard as "Itsalright".

Speaking implies sentences, sentences have separate words. Words contain sounds, i.e. letter sounds. Children do not realize this. The spoken language is divided into smaller parts and these parts come together to make words and sentences. Having this awareness is called "Phonological awareness".

Reading and writing is dependent on understanding the relationship between the sounds in the spoken language and the letter symbols in

[1] The "onset" is the initial phonological unit of any word (e.g. c in cat) and the term "rime" refers to the string of letters that follow, usually a vowel and final consonants (e.g. at in cat).

language. Hence, children should be able to differentiate between the smaller parts of the spoken language, such as syllables, onsets and rhymes before they are taught writing. The realization that sentences contain words and words contain sounds, helps children immensely in reading and writing. For example, the words 'run' and 'sun' have separate onsets, but identical rhymes . 'Run' has two parts, 'r' and 'un', while 'Sun' has two parts, 's' and 'un'. For children to realize this, some activities should be conducted in kindergarten and grade one.

Activities for Phonological awareness

- Tai says a sentence and children clap once for every word.
- Count words in a sentence.


## Acknowledgment

The addition of the new chapter 'Awareness of the Structure of Language' has been included in the third edition of the Khelghar handbook. During the time of working with the organization QUEST, we got introduced to some new concepts and perspectives by Nilesh Nimkar. Later, through studying his articles and the practical application of those methods in Khelghar, this understanding became firmly established. In the writing of this chapter, references have been taken from the following articles by Nilesh Nimbkar:

1. **Emergent Literacy:** A perspective on looking at the literacy development of young children
2. **Awareness of Sounds in Language**
3. **Classroom Activities for Developing Awareness of Sounds in Language**


- Add a word to the sentence.

E.g., Ram went to the garden. Ram went to the big garden.

- Change a word from the sentence

E.g., Ram ate mangoes. Ram ate apples.

- Clap for rhyming words

E.g. there was a cat. She sat on a mat.

- Find words that don't rhyme.

E.g., cat, bat, sun

- One child says a word, e.g., 'pin' and throws a ball towards another child in the circle. The other child catches the ball and says a word that rhymes with 'pin', e.g., 'tin'

**Creating awareness of letter sounds**

- Children clap once for every syllable.

E.g. tiger. Children clap twice for ti – ger

- Tai groups the children based on the number of syllables in their name. e.g. if she claps twice, children who have two syllable names, such as 'Mala', 'Tara' make a group.
- Play the word antakshari. E.g. If the word is 'David', the next word has to begin with letter 'D'.

Alliterations (Weird Willy sentences)

- Take any word, e.g. pencil. Find words that describe the pencil and begin with 'p'. E.g. precious pencil. Pinku's precious pencil. Pinku's precious pink pencil.
- Adding or removing a letter from a word – Spun, Sun, Sunny. Such games, when played frequently, help to create an awareness about the separate sounds in sentences, words and letters. It also helps children with their writing.

# Reading and Comprehension

"Books are sometimes windows, offering views of worlds that may be real or imagined, familiar or strange. These windows are also sliding glass doors and readers have only to walk through in imagination to become part of whatever world has been created and recreated by the author. When lighting conditions are just right, however, a window can also be a mirror. Literature transforms human experience and reflects it back to us and in that reflection, we can see our own lives and experiences as part of the larger human experience. Reading, then, becomes a means of self-affirmation and readers often seek their mirrors in books."

**– Rudine Sims Bishop**

Being able to read is not just a step, but a leap in the path of language development. Many abilities and skills need to be developed for a child to be able to read. The child should be able to sit in one place for a length of time. She should be able to concentrate on the given text. She should understand the script written on the paper. When abstract skills such as relating text to past experiences and making predictions using the previous knowledge are ingrained, meaning emerges from the written text. Decoding the script is not reading. Mr. Nilesh Nimkar introduced us to an all-encompassing definition of reading –

"The process of meaning making through the interplay of the reader's foreknowledge, information contained in the written text and the situation in which the reading is taking place is called reading."

Children from some middle class (literate) families see adults enjoying reading. They have seen adults fully engrossed, sometimes laughing to themselves, sometimes even crying while reading. Children start to believe that reading is something special. They become curious about the written words. But if there is no written material available in the house, then it is difficult for this curiosity to arise in children's mind. They do not get informally introduced to the written language (printed material). Hence underprivileged children have a hard time relating to reading taught in schools. Reading plays a major role in our life. Reading increases the possibility of expanding the horizons of children's experience and sensibility.

The book is a window…

For children to become literate in the true sense, there is no alternative to establishing their relationship with books. Once they realize the fun in books, they crave to learn to read books. The probability that they will stay away from the path of reading and writing becomes negligible. We should read out stories and poems to children with the same urge and love that we have while feeding them. We should ensure that there are always books around them.

**Varsha Sahasrabuddhe**
Palakneeti,
Oct-Nov 2013

New words and their meanings introduce the reader to realms beyond her direct experience. The joy derived from reading in turn fuels one's interest in reading.

We can extend this magical experience to children by developing their interest in reading. Reading is very important in academic life. It opens horizons of knowledge for children. They start to think. They gain confidence in their speech and creativity in writing increases.

## How do we develop children's interest in reading?

To develop interest in reading, children should have fun in the process. They should understand what they read. The written word should become transparent and show them the underlying meaning. They should see a glimpse of their own experience in that meaning. They should also be able to glance at the unknown through it. This activates the imagination. Children can then explore the writer's world using wings of their own creativity.

For this beautiful dream to materialise -

- They should be exposed to a 'print-rich' environment. The text should be displayed at children's eye-level for easy viewing. Instructions, pictures and their names, words from children's vocabulary, songs, stories, action and experience stories should be included in the print-rich environment.
- They should see that adults also read.
- Reading and writing in school should be related to the children's emotional environment.
- They should get ample opportunities to listen to stories from adults.
- They should be around attractive and beautifully illustrated books. Places such as reading corner, string library, 'Book Clinic' should be created in the classroom.
- They should be given frequent opportunities to talk about what they read and express an opinion about it.
- They should be encouraged to express their feelings after reading, through use of complementary activities such as drawing, sculpting, enactment, poster making, presentation and so on.
- Picture reading, word-picture cards, instructions, reading material, assembling the passage, practice sheets are some resources which should be used a plenty in the classroom.
- Children should be encouraged to make the shift from reading aloud to reading silently.

Some activities are listed below which can prove useful for motivating children to read.

## Picture reading

Before they learn to decode the script, children feel closer to pictures than meaningless symbols in the script. They have an innate ability to view the world with fresh eyes and hence pictures speak to children. The experience of looking at many pictures and talking about them contributes positively to children's early exploration of language. Children should have easy access to look at pictures from story books, newspapers and pictures by famous artists that can be viewed over the internet. Conversations with pictures provide lifelong nourishment. Tai needs to have a keen eye for this. This is possible only if Tai genuinely understands the importance of collecting pictures for

children, displaying them and having conversation about them.

Madhuri Purandare has created a wonderful educational tool that can be kept readily available with teachers -

Her book of compiled pictures, called 'Picture Reading'! It also mentions guidelines about how the book can be used with children.

The pictures in the book contain many objects, characters and events. Every small part of the picture has a character of its own. Hence these pictures attract and mesmerise children.

## Conducting picture reading with children.

Age group – 5- 14 years, duration- 15-30 minutes

Group size – one child or a group of 4-5 children

Keep the picture at the center, facing the children. Let them observe it to their heart's content. Do not hurry the conversation. Let them speak spontaneously while looking at the picture. After 5-10 minutes start conversing about the picture. If the child does not volunteer to talk, Tai can provide a few easy pointers to encourage the child to talk.

- Did you like the picture? What did you like?
- What do you see in this picture? E.g., objects, animals, people
- What are the people doing in the picture?
- Which place might this picture be from?

In the next stage, we encourage children to think and imagine what is beyond the picture. We can ask a few questions to help.

- What is happening in the picture?
- What will happen next? Have you had such an experience as shown in the picture? How is the picture different from your actual experience?
- What time does the picture depict? If it is morning, what do you think might happen here in the afternoon or in the evening? How will the picture change?
- What will you do when you visit the place in this picture?
- What will happen if all the people and the children in the picture disappear?

## How does picture reading help language development?

- Observation skill develops. Vocabulary increases.
- The child tries to name things in the picture, from obvious objects to smaller details.
- The child relates the picture to her own world and tries to speak about it.

Picture reading, having conversation about pictures

- The child learns to use words accurately in sentences and conversations.
- Curiosity to look at pictures increases.
- The child starts to think subconsciously at an abstract level.
- Comprehension and analytical skills develop.
- The child starts to imagine possibilities and starts to play with language. She asks questions and strengthens her language while looking for answers.
- Extension activities
- Children can be asked to write as many verbs, adjectives, nouns as they can think based on the picture.
- Children can assume roles of the characters in the picture and write small dialogues for them. For example, a conversation between a boy and a woman selling balloons.
- They can create a story or a skit based on the event and the characters in the picture.
- They can write news based on the event shown in the picture.

## Reading Paragraphs

In the process of learning to enjoy reading, the first step is crossing the threshold of the script, which can be done with the help of reading itself. One can introduce word cards, the alphabet, words and sentences starting from a given letter.

After three or four months of these activities, the child starts to read picture books by making a few guesses. At this stage we can connect this to the structure of the textbook lessons by creating 'Reading paragraphs' for the child. Some children do not relate to the language in the textbook. This can make them feel distanced from reading.

## Reading Cards created by children

**My Cat**

We have a small cat.
Her name is Sheeba.
I have built a house for her.
She sleeps in her house every day.

- Sheetal Ghodke, Grade 3

**Friends**

Sapna's father hit her because she came home late. Sapna started crying. She told her friend everything.
Her friend said, "Come, let us play!"
They played ball and Sapna felt a bit better.

- Rajshri Kamble, Grade 4

If children see stories related to their environment on the Reading paragraphs, they easily start reading them.

Reading Para can be created by writing the text neatly on ruled paper and sticking it on a cardboard, so that it can withstand wear and tear from multiple uses. A Reading para contains written text of 5-6 lines related to any subject that the children can relate to. The sentences in the text should be easy and small. It should contain punctuation signs. There should be two or three simple questions based on the text. Depending on the level of comprehension, the difficulty level of questions can increase; Complex questions that make children think can be introduced.

Age group – 9-14 years. Duration – 20 minutes

Two children can work on one Reading para.

Let us see an example

Ram and Geeta were playing with their cars.
They were having fun.
Suddenly the cars crashed.
Ram's car broke into two.
Both were afraid.
Geeta joined the two pieces using sticky tape.
They started to play again.

Questions about this text –

- Who was playing with cars?
- Why were they afraid?
- What did Geeta do to continue to play?

Creating the text for the Reading Card requires skill. Something of interest needs to happen in those few lines of text. The event should also be familiar to the child. The first few questions should be such that their answer can be easily found in the text. Subsequent questions should be such that they can be answered only if the child has understood the meaning of the entire text.

The child should first read the text by herself and try to answer the questions. Then we can ask the child to write the answers. Every child reads, understands and accordingly writes as per her own capacity. This helps' Tai to understand where the child is placed with regards to these skills. Textbook lessons are lengthy and may be unrelated to the child's experiences. Reading Cards help the child to reach that stage.

Retaining children's interest in reading beyond picture books requires effort. Children might find reading articles or informative text to be boring. They may not feel interested in such reading. Hence it is necessary to make a variety of Reading Cards for middle and high school children. They need to be taught to 'study' a text by trying to understand the new information that is presented therein. Their understanding deepens while trying to find answers to the questions based on the text and we can evaluate their comprehension. The study skill of 'Reading and Comprehension' proves to be very useful throughout life.

### Assemble the paragraph

Age group – 9 to 14, Duration – 5 to 10 minutes

Create a paragraph of about 8-10 lines based on an event, a situation or an action. It should have simple and precise sentences about the given event. Each sentence is written on a separate paper strip. Children are asked to arrange the strips in a sequence to assemble the paragraph.

Children read the sentences over and over while trying to arrange the paragraph. They can arrange them in

sequence only if they understand the meaning of the sentences. For example –

Deepali broke a cup.
She immediately brought the broom and dustpan.
She swept the pieces of glass into the dustpan.
She put the pieces of glass in a separate bag.
She kept the broom and the dustpan away.
She washed her h ands and dried them with a towel.

Tai must ensure that the sentences can be arranged only in a unique manner to make the paragraph. If there are multiple ways of arranging the sentences into a meaningful paragraph, it might be confusing for the children. It is advisable to write the paragraph number and the count of sentences in the paragraph behind each sentence strip, so that it is easy to notice if a strip is misplaced. But these numbers should be written in a way that children will not be able to decipher them.

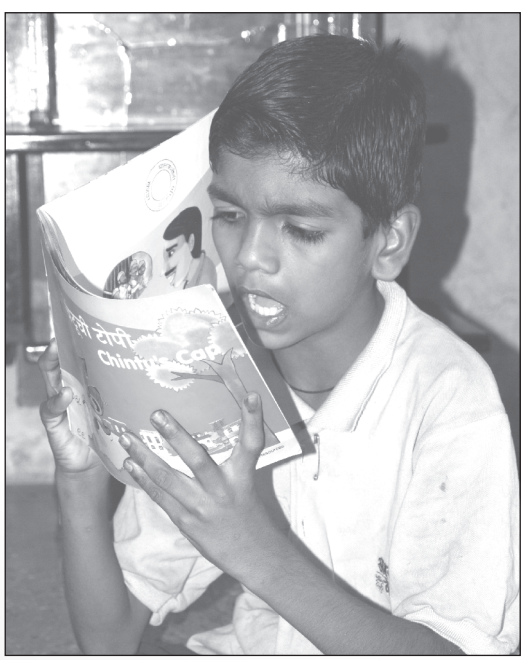
For example-

If there are seven strips in paragraph number 2, then the strip for the second sentence in that paragraph will have 2/7 written behind.

A copy of all the paragraphs should be kept in the file for reference.

What is achieved through this?

- Children read the strips multiple times and make meaning from it.
- They relate it to their experience and imagine the sequence of actions while arranging the strips.
- They develop a liking for reading.



Understanding the script

**Blank slate**

*In the book 'Daddy Long Legs', a girl named Jerusha who has grown up in an orphanage writes a letter to her unknown father.*

*"I have a new unbreakable rule: never, never to study at night. Instead, I read just plain books--I have to, you know, because there are eighteen blank years behind me. You wouldn't believe, Daddy, what an abyss of ignorance my mind is; I am just realizing the depths myself. The things that most girls with a properly assorted family and a home and friends and a library know by absorption, I have never heard of!"*

**Kalpana Sancheti**
Palakniti, October-November 2008

- Writing the paragraph in their notebook gives them practice for writing.
- Children become engrossed and participate in the task.

## Book reading

Khelghar should have books that children will enjoy. They should have easy access to books. The books should have pictures. Pictures help us to create images about things beyond our experience. For example, pictures of elephants, giants, kings, big palaces etc. broadens our horizon. The books should be sturdy. Children should get a variety of books, such as informative books, entertaining books, poetry and stories.

Children who have recently learnt to read do so at a slow pace. They take time to understand the meaning. This might lead them away from reading. Hence it is important for Tai to frequently read out to children before they can independently explore the world of books. Participatory reading is one such approach. Read-aloud is another way. Reading aloud helps children to realize how language is used and how to make meaning of it. A model of how fluent readers read is presented to children. They also understand how comprehension occurs. They become motivated to read independently. It is imperative that we read books aloud to children of all ages, from those who cannot read, to children of grade eight.

## Introduction to books

Before reading out to the children, we should introduce them to the book. We can ask them to look at the pictures first and start a conversation about what the story might be and write their answers on the blackboard.

The first thing that is observed when a book is held up is the cover page and the picture on it. Can something about the story be guessed from this picture? The name of the book is also written on the cover. Like us, books also have a name. It is the identity of the book.

The cover page also carries the name of the author. Sometimes, the original book is in a different language. The name of the person who translates it into our language, i.e., the translator, is also mentioned on the cover page. The back cover has some information about the author or reviews by renowned people.

The name of the publisher is written inside the front cover. We can tell children about the process of publishing a book. The price of the book is also mentioned. Children should understand how pricing works. The next page has the index. This contains the title of the stories and the poems in the book. We can introduce children to all things related to the book.

## Reading aloud

While reading the book aloud, one should pause at a few places and talk about the context and meaning of the story. A few questions can be asked to check if everybody is paying attention. We can also pause just before the story takes a turn and ask children to guess what might happen next. Questions such as "Why might xx character have behaved in this manner?" or "How did he manage to do that?" help children to understand the story better. Difficult words can be noted and discussed.

Arranging sentences in the paragraph

Children should have an opportunity to talk freely, ask questions and share their opinion during the read-aloud session. It should be kept in mind though, that the conversation should be short and crisp so that the flow of the reading is not interrupted.

## After the read-aloud

After the reading, the Tai should ask questions that make children think before responding. Do not ask questions that can be answered in a word or two. "Did you like the story?" "Why did you / did you not like it?" "What new

### Getting ready for reading aloud

Thoughtful planning and a lot of practice is necessary for conducting a successful read-aloud session.

### Choosing the book

Children's age group, their emotional environment, needs and preferences should be kept in mind. The book should be such that children enjoy it, become engrossed in it and it triggers their imagination. Magic, ghosts, mystery, fairies and fantasies are fun themes to choose from.

The story should have a close connection with children's daily life. Simple books which reflect children's thoughts and experiences should be chosen. The pictures in the book should be effective and attractive. The book should be inclusive and should portray all social groups respectfully.

The book should be a level higher than what the children can easily read. It should introduce children to various aspects of the language, i.e., vocabulary, structure, variety and so on.

### Practicing read-aloud

The presentation should be dramatic! Before the actual read-aloud session, it is advisable to practice reading the book aloud at least 3-4 times. The goal is to ensure that the meaning and emotion from the text reaches the listener. Thought should be given to sentence and word intonations, speed of reading and conversations from the book to make it interesting.

Observe the pictures from the book. Mark the difficult words, interesting usage of language and such places in the book. Children should feel interested in listening to the story, so one must think about how that can be achieved. Noting down the questions to ask during the reading helps.

things did you understand from it?" "Did it remind you of anything else?" are great conversation starters. Children should be given a chance to construct the meaning of the story as a group, through their spontaneous responses and conversations. Tai should not explain the story. If she feels that the children have misunderstood some part of the story, she can read it out again and encourage children to think about it further. Children can sketch drawings of something from the story that they can connect with. They should be encouraged to draw something different from that shown in the book.

Children love to enact stories. Try to retain the language from the book in the enactment. Tai can help children with writing the dialogues.

Children can make a poster with their reviews of the story. They can also write a letter to one of the characters.

Activities such as extending the story, changing the ending or the name of the story can be conducted. Tai should note her observations during the entire process. "What special characteristics of children did you observe? What needs of children did you notice? What do you need to improve while conducting the read-aloud session?" - are some questions Tai can ask herself. This will help in her planning for future read-aloud sessions.

## Introducing poems

Poems are very helpful in creating an affinity towards reading. Poems have rhythm and word play. Poetry books, pictures and familiar poems are very enjoyable experiences for children. Children develop a close connection with poetry books.

Poems are easily remembered and memorized. One needs to delve deep into the words of the poem and relate them to personal experiences to understand the meaning of the poem.

## How to choose poems?

Avoid moral, prescriptive and boring poems. The poem should be written with the children's sensibility and age group in mind.

- The language should not be complex. The poem should flow easily while playing with the language. Re-reading poems helps children to uncover the various aspects related to language, pictures and meaning of the poem and helps them to memorize it. They form a relationship with the poet and the adult reading the poem to them. They are very naturally introduced to the standard language. Children should be given ample time to talk about the poem after reading it.

## Creating books

What fun it is to create our own book! Younger children can draw pictures or paste pictures/poems cut out from magazines and newspapers to create a book. Older children can write their own book. Children can experiment with the size, layout and content of the book. Children feel a sense of belonging to this book because it is their own creation!

### Tai's Reading

Tai's behaviour and habits should indicate to the children that books are something wonderful. This reading is to be done by Tai, not for children, but for herself, for the sheer pleasure of reading, to spend time joyfully and because she can't hold herself back from reading! Tai should always carry a book with her that she is currently reading. She should show the book to children and talk to them about it and what she thinks about it. When children see that their Tai enjoys reading, the possibility of their reading increases manifold!

**- Varsha Sahasrabuddhe,**
Palakneeti, Oct-Nov 2013

## Handling books

After getting introduced to books and delving into their world, now is the time to understand how to maintain this treasure trove. Children should be allowed to handle books freely. They should have the opportunity to see old and new books on a variety of subjects. They should experience the smell of a new book. At the same time though, they should be taught how to handle books carefully. They should be shown how to turn pages, not to lick their finger before turning the page, to use a bookmark to mark a page and not fold it or not to keep an open book face down when you want to pause the reading or write/mark on pages and to be careful not to spill anything on them. These rules can be discussed in a group. Children imbibe the value that these rules are our way of caring for books, are made because of our love and our desire that everybody should get the opportunity to read them.

A corner of the classroom can be a "Book Clinic" which has all necessary material to repair books.

To maintain books for a longer time, we can take children's help in covering the books with transparent

plastic wrapping paper. We can also guide them for categorizing books. For example, nature books on one side, stories in another set and poems in a third set. These can be organized and displayed on a shelf. All books can be listed in a notebook. Children can run the library themselves. This will increase their love and involvement in books.

## Reading fair

Underprivileged children do not get enough opportunities to be in an environment conducive to reading, hence we need to organize some special activities with them. A "Reading fair" can help children interact with books for an extended duration and help them to take a leap to the next reading level. Such fair can be conducted for a week or even a month during school vacations.

## Khelghar Reading fair

From simple instructions to research articles, we read and understand a variety of material in our daily life. In the Reading fair at Khelghar, we begin with the text that we read in our daily life. Children make a note of hoardings, advertisements, instruction boards etc.

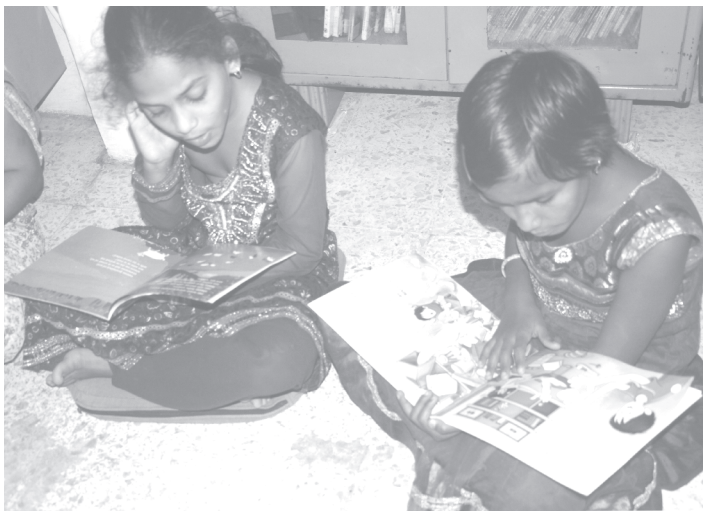
Children create written material such as instructions for the classroom, attendance register, weather chart etc. Material created for reading in Khelghar, such as picture cards, instructions, picture reading, dominoes, assemble the paragraph, etc. is displayed in a corner. Children can play with this material freely.

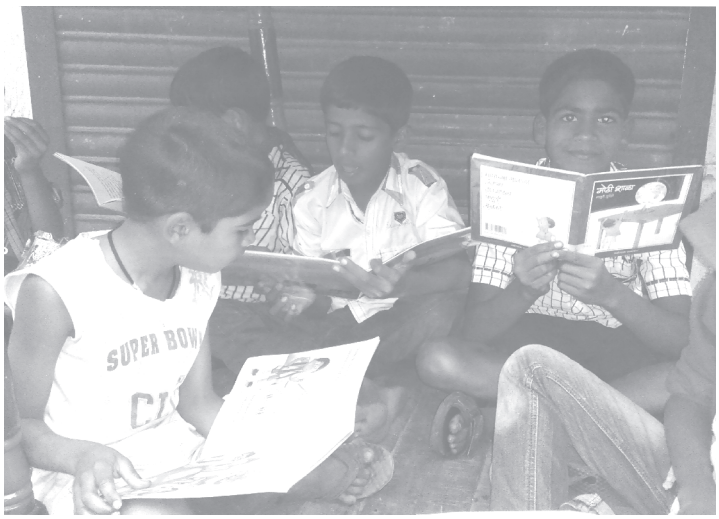
We can also arrange a display of documents used in daily life. Children observe and understand documents such as the Aadhar card, ration cards, progress reports, bank passbooks, etc. This helps to reduce the anxiety felt towards official documentation.

Children are introduced to the newspaper. Reading material of increasing difficulty level, like jokes, sports news, regional news, national and international news and editorial sections can be gradually introduced. Children can be told about the context of current events.

Another activity is creating an advertisement from a news item or creating news from an advertisement. The news is in the past and the advertisement is in the future. This activity tests children's language skills to the fullest. They draw pictures based on the news and create news based on events in the basti.


**Reading Fair at Palakneeti Khelghar in 2015**





Khelghar's open library in the basti.

We display books from various genres e.g. Story books, adventure books, horror stories, science fiction, love stories, novels, biographies, short stories, art books, text books etc. in a book exhibition and introduce them to children.

Children create pictures, posters, write reviews and perform skits based on their reading.

Activities such as these held continuously for a month go a long way in making children become a part of the world of books.

## Evaluating Children's Reading

The goal of evaluation is to understand whether children can make meaning out of what they read. Here are some activities that are useful for evaluation -

1) Arrange sentences in a sequence and make a paragraph
2) Write answers based on some text
3) Children's responses on reading
4) Read-aloud sessions

## About reading

A well that is fed by live streams never runs dry. Reading books is such a stream that feeds us all. Hence adults should also read a lot. Reading includes decoding the words presented to us, understanding their meaning, thinking about what the author or the poet wants to convey, understanding the emotions and the ideas, expressing ourselves based on this, either in our mind or openly and assimilating what we feel is right. This definition tells us that reading is a lifelong process.

It is not easy to inculcate the reading habit in children. There are numerous distractions for children. Mobiles, cartoons, internet and many more. However, we should keep up our efforts and hold on to the belief that what is sown shall definitely reap.

## WHY IS IT ?

**Why is it some mornings**
**Your clothes just don't fit?**
**Your pants are too short**
**to bend over or sit,**
**Your sleeves are too long**
**And your hat is too tight -**
**Why is it some mornings**
**Your clothes don't feel right?**

# Learning to write

Tai was having a conversation with children about how they spent their Diwali vacation. A child quipped, "Tai, I hope you are not going to make us write all this down!" Children's resentment towards writing clearly shows in such incidents. It is seen in adults as well. We generally dislike writing.

The roots of this dislike may be seen in our school education system. The script is introduced in a technical and traditional way through letters, words, sentences and paragraphs. Letters or words carry no meaning on their own. Hence, children toil for a long time in the uninteresting task of trying to find meaning while practicing writing. This reduces their interest in writing.

Writing is a very joyful activity. The reader is not in front of the writer, hence the writer has ample time and leisure to pen down one's thoughts with full concentration and clarity. Thoughts become clear as one starts to write them down. Written words persist. They can be referenced again and again.

## Advantages of writing

- Writing one's opinions, expressing and conversing with oneself.
- Conversing with someone who is not present now.
- Storing information, experiences, events, references and knowledge for a long time.

Even for children, writing provides some immediate benefits

- Writing a note for someone who is not at home
- Writing a letter to their favourite person
- Noting down reflections in the form of a diary
- Preparing for exams – classwork, homework and notes.
- Writing answers in exams, getting good grades etc.

The teacher is the only reader of children's writing at school. Classwork, homework and answer sheets are written with the aim of getting them evaluated by the teacher. The writing is done as per the teacher's dem and, as a part of the teacher's evaluation tool. Due to this, children do not understand the need for writing and they do not develop interest in it.

At Khelghar, children should find joy in writing. Children can be encouraged to write to their friends, parents, other children, members other than Khelghar and to other people. The reader can also be imaginary. For example, the dog who visits the classroom in the lunch break, a bus, children from the neighbouring village, the chief minister, etc.

The use of language differs depending on who the intended reader is. For children to feel the need to write, to think in that direction, they should have enough space.. Only then children will feel like writing.

## To preserve the interest in writing

Children should get ample opportunities for indulging in word play, language games and activities, so that during and after being introduced to the alphabet, they can keep writing wholeheartedly without getting bored of it.

Learning to write with Tai's help…

Here are a few activities that can be conducted with children to retain their interest in learning the language.

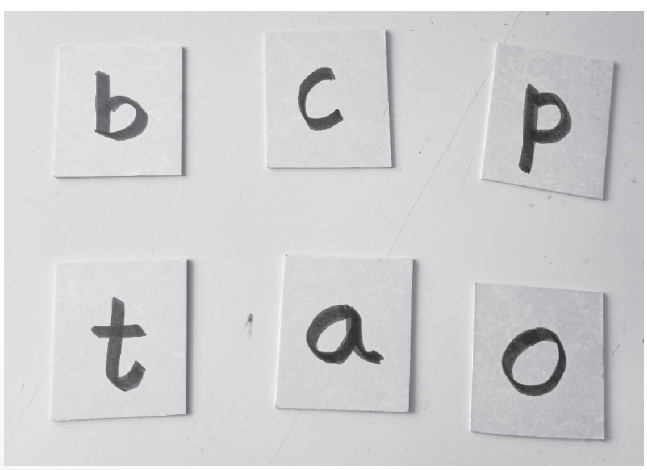
Children are now familiar with the script. They can read but cannot write well. They need practice. At this stage, language games should be made a part of the language pedagogy. Games are fun and challenging. Hence children enjoy them and strive happily to be good at them. These games provide ample opportunities for children to write words and sentences.

## Game of dice

This game is played with the normal dice used in board games like snakes and ladders. Convert the dice to a "letter dice" by sticking different letters on the surfaces of the dice. This dice can be used for a variety of language games

- Children sit in a circle. One of them rolls a dice. If the dice shows the letter "c", then the child on the right side comes up with a word starting with c. Now the second child throws the dice and the next child tells a word starting with the letter that comes up. If the child cannot come up with a word in fifteen seconds, the next child gets the turn. The child who missed the turn is given another chance after the round is complete. He is asked to think of the word while the game is going on. After the round is complete, all children try to remember as many words as possible and write them in their notebook. Children try to remember maximum words because of the healthy competition involved. If there is a mistake in their writing, Tai need not cross it out in red like it is done in schools, but should write it in the correct way and show it to the child. Children rewrite those words. Children are asked to select one word from the list, make a sentence using it and write it in their notebook.
- One child plays the dice. All children say one word starting with the letter that shows up on the dice. If a child is unable to come up with a word in fifteen seconds or repeats a word, the next child gets the turn. For example, if the letter is "t", then words like tiger, time, table etc. will be listed. Tai can also participate and introduce different words like "title", "tiring" and so on. This will help increase children's vocabulary. After 25-30 words, children will try to remember as many words as possible and write them down. It should be noted that this game is not an alternative for vocabulary expansion that happens through reading.

For older children or children who have played this game a few times before, we can increase the difficulty level by using a pair of dice. One die will have consonants and the other can have vowels. E.g. one dice shows "m" and the other shows "a". Children say words that start with "ma". It is up to Tai's skill to modify the game for various difficulty levels.




**Dice for letters and vowels**

## Making words

Duration – 10-15 minutes. Age group – 8-14 years

Number of children – 4-5 in a group

| | | | |
|---|---|---|---|
| M | T | D | A |
| N | S | R | I |
| V | G | U | E |
| H | C | F | O |

Children are given a few consonants and a few vowels and they try to make as many meaningful words as possible using them

This can be done orally first and then children can be asked to write the words.

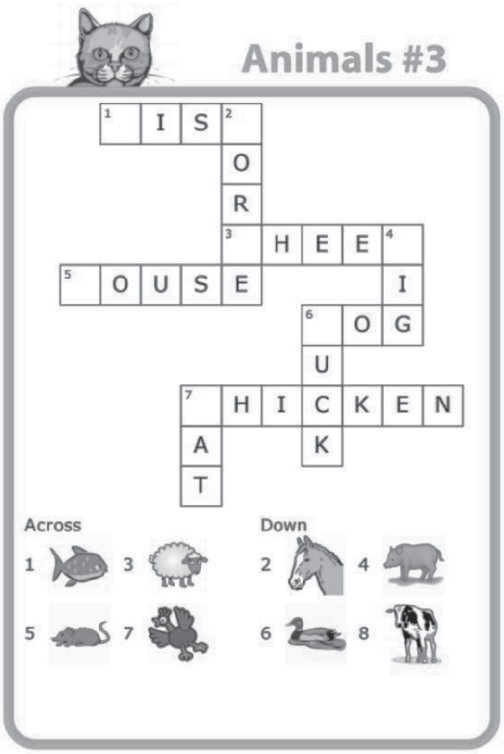
**- Many from one**

We can use big words and create multiple smaller words from it. E.g. vegetables. Tai writes the big word on the board and

Children find smaller words such as get, table, able etc.

**Crossword puzzles**

Children's magazines and books have crossword puzzles, but they can be quite complicated. For children who are just learning to read and write, we can create simpler puzzles.




Children can use pencils to solve this, so that they can attempt it multiple times. It is great fun to create these puzzles. Children who want to try to make puzzles can do so with Tai's help to begin with and then on their own. As only one child works on one puzzle at a time, the Tai should have enough puzzles for the entire group.

**Games like crossword puzzle**

- Children sit in a circle. One child goes outdoors and thinks of one word based on what he sees outside. When he comes back inside, other children are asked to guess the word in his mind. To help the guess, the child gives clues in the form of words that describe the word that he has thought of. For example, if he has the word "sky" in his mind, he will give clues using words such as "blue", "vast", "cloudy" and so on. The lesser the number of descriptive clue words required for the children to make a correct guess, the more points the child gets!
- Keep leaves of various shapes and colours at the center. One child chooses a leaf out of those and starts to say words that describe the leaf. For example, "sharp", "thorny", "hairy" etc. Other children use these clues to guess which leaf the child has chosen to describe. The lesser the number of words required to describe the leaf, the more points the child gets. One can also use objects, books and other things instead of leaves.

Words that describe objects are adjectives. These two games provide the opportunity to select appropriate adjectives and increase vocabulary. Tai makes a list of all these words on the blackboard. Children create sentences using these words.

**Sentence tower**

A child writes a one-word sentence on the board. The next child adds one or two words to make a new meaningful sentence. This continues and a long sentence is constructed. For example -

Go.

Go home.

Go home quickly.

Go home quickly after school.

Go home quickly after school on Saturday.

Be sure to go home quickly after school on Saturday.

**Word Antakshari**

Antakshari is a game that all of us have played and enjoyed. It can be played with boys/girls names, city names, names of things/objects and so on.

Children sit in a circle with Tai. We can decide who starts the game using our age old technique of singing - **'बैठे बैठे क्या करें। करना है कुछ काम। चलो शुरू करें**

**अंताक्षरी, लेकर कवी का नाम!**' The child who is pointed out at the end starts the game with the letter "M". The child on the left comes up with the next word that starts with the ending letter of the first word. For example, if the first child says "mop" the second child has to say a word starting with "p", e.g. post. Tai writes the words on the blackboard.

Players keep a count of how many times they miss, i.e., need more than the given time or cannot come up with a word.

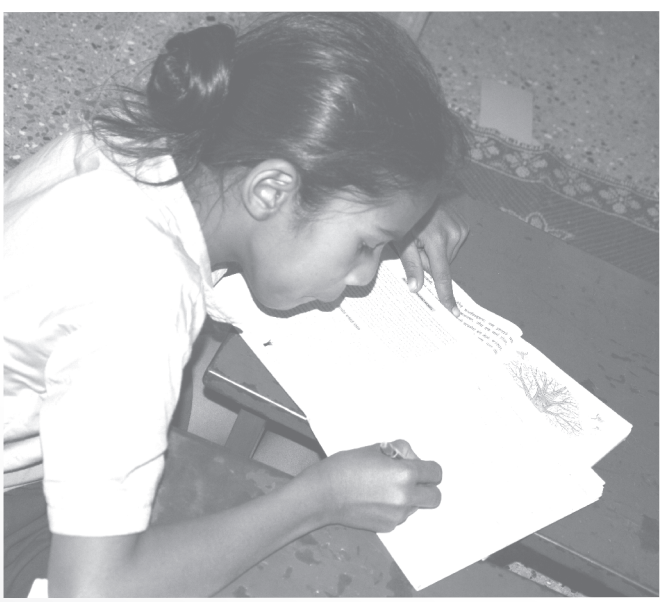
This game can also be used for practicing writing, like we discussed about the game of dice.

This game can be played in another way as well. Children st and in a circle. One child says a word and tosses the ball to another child in the circle. That child tells a word starting from the last letter of the word and tosses the ball to someone else. The ball can be tossed to anybody, so all participants must be alert and keep thinking of words.

The game can be played using topics like names, city names, nouns and adjectives, verbs etc.

**Name, Place, Animal, Thing**

A grid like the one given below is drawn on the board. Children copy it in their notebook. We choose any letter and ask children to write words starting with that letter in each column. This is a timed activity. If multiple children write the same word, they get half a point for it, if their word is unique, they get a full point. This makes children naturally think of different words.



**Trying to write**

For example – the letter "M"

Name – Meera
Surname – Mohite
City – Mumbai
Fruit – Mango
Flower – Marigold
Animal – Monkey
Bird – Magpie
Thing - Mat

This game is good for vocabulary, memory and writing practice.

Name – Manoj
Surname – Marathe
City – Mumbai
Fruit – Mango
Flower – Marigold
Animal – Mouse
Bird – Magpie
Thing - Mirror

**Playing with words**

Children know the letters; they enjoy making words and sentences. At this stage this game can be a lot of fun.

1) The words ending with 'an'

e.g Pan, Can, Ran, Man etc.

The words ending with 'er' e. g Buyer, seller, bowler etc. Words starting with 'Tr' e,g Train, Trash, Tram, Trap etc.

You can have many more such activities.

2) Find words with given number of letters

E.g. 2, 3 , 4,…...

Me, cat, star and so on

3) Change one letter to make a new word

E.g. tart – start, on – one, it - pit

4) Words depicting sounds

E.g. croak, roar, chirp, creak

**Make a list**

Children can be asked to make lists of names for

- Round, square, triangular, longish things
- Smooth, rough things
- 20 items that can fit into a matchbox
- Pointed things
- Sweet/cold/spicy/salty things
- Healthy food items, favourite food items
- Tall/short things, moving things, floating things

Children should be asked to choose one or two words from the list and use them in sentences. The sentences might be simple in the beginning. Later children can be encouraged to convey their experience through the sentences.

**Connecting the context**

It is possible to connect the context more meaningfully when the child has befriended the language and is ready to move from sentences to paragraphs. It is often our experience at Khelghar that children can copy well what is written on the board or from the textbook, but face challenges when asked to write something on their own. Free writing requires thinking and prior knowledge.

**Some abstract topics**

- 10 things that give me joy
- 3 things that I am bored of
- 5 things that make teachers angry
- 5 things that can be bought with Rs 5/-
- 5 subjects I would like to learn
- 3 things that I will never do

**To help children write in the standard language**

Ability to write has prime importance in children's life. We want to gradually take children to creative writing so that they do not get bored of writing and express themselves freely. Tai should not respond to children's writing by crossing out their mistakes in red. This discourages children. Most of the mistakes made by children who have just learnt to write are due to different pronunciations of the same words in their spoken dialect and the standard language. These are not mistakes in the real sense. We should avoid pointing out such errors till grade four. After that, we should encourage the child to speak and write in the standard language by demonstrating the correct pronunciations. This helps the child to reduce errors in speaking and writing. Tai should try to figure out the challenges the child faces in writing. There can be multiple problematic areas, such as the alphabet, sentence structure, grammar, gender, tense, singular/plural etc.

Let us see some sentences written by the children .

This is books.

He like cake.

These are man.

This child has not understood how the verb changes as per the subject

Punctuation

I bring bread butter jam

We should teach children to go through their writings once again.

If they read whatever they have written, they themselves will be able to correct some of their mistakes.

If the child receives precise help from Tai, she will slowly but surely start moving towards the standard language.

Pay attention to the meaning of children's writing. Try to understand it. Give proper feedback and response. Commenting on children's writing is not a mechanical process, but is a written conversation between Tai and the child. It is also a form of help received by the child from Tai. It helps the child to take a leap to the next level of writing.

**Expressing the abstract thoughts through concrete words.**

Here, the speed of writing and thinking does not match. This requires practice. Thoughts need to be organized in the format of listing the points first, then clarifying each point and coming up with a creative start and end for the text. Children need help to accomplish this. Following activities can help children connect their writing with the context and meaning.

**From words to sentences**

At the early stage, we can take activities like constructing sentences according to a given sentence structure. (E.g., He/It/This is _____.) This activity should be discontinued soon, as children start limiting themselves to the same sentence structure. We want to teach children to make a variety of sentences. We need to use different kinds of sentence structure. For example, the sentence - This is a blackboard. This is according to the sentence structure. What else can we say about the blackboard?

- It is black.

- I write on the blackboard.

Children can construct many of such sentences.

- Children can orally make sentences through these games, but they are not yet able to write them. We can suggest making some small and simple sentences for writing. For example, children can add different words to a given verb to make different sentences. E.g., go. Go home. Go to school. Go to the temple and so on. Verbs such as write, eat, take can be used for practice.
- We can also ask children to make sentences by using a given noun. E.g., cycle (Drive a cycle, Clean the cycle, The cycle is yellow.)
- Children enjoy making sentences for instructions, messages and slogans.
- What activities do I do after waking up in the morning? What have we done since coming to the classroom? We can write answers to these questions on the blackboard. Their answers will have various verbs. Children can be asked to write them in proper sequence in their notebook.

**Story/Narration of an Experience**

Duration – 20 to 30 minutes. Age group – 8-12 years

Number of children – 10-15

This activity is started with a small action, such as preparing lemonade. Tai has to make preparations for this activity beforeh and. Then Tai and the children prepare the lemonade together. After drinking it the post-activity is clean-up. Everybody sits in a circle and, children list the actions done one by one in sequence to prepare lemonade.

We took a bowl.

We added ten glasses of water to the bowl.

We added twenty teaspoons of sugar to it.

We added one teaspoon of salt to it.

We squeezed in two lemons.

We stirred it with a spoon.

We poured it into glasses.

Everybody drank lemonade.

All children should write this recipe in their notebook.

Tai should note all the steps as told by the children, in their own language. The next day she should prepare a chart with the same steps in legible bold letters so that all can read it. It should be displayed in the classroom for a week. Children should be asked to read it a few times.

Making paper boats, putting covers on books, making decorations using flowers and leaves are some activities on which experience narrations can be made. Reading these narrations over and over again helps children to understand the structure and the sequence of sentences. Children should be asked to write experience stories based on the activities in the classroom. Do not insist that they use the standard language or expect grammatical correctness to start with. After a few days, instead of crossing out errors in writing, Tai should show how to correct the error and herself write the correct word. . Children should then correct their own writing accordingly. Activity → talking about it in an organized way → reading → writing - is the sequence which helps children to integrate the recollection of their concrete

**Experience – Preparing and drinking lemonade…**

experience and their expression in script.

**Some reasons to write**

Younger children might find it difficult to think about abstract subjects. Tai should think of such topics and provide opportunity to write that children will like and enjoy.

One day, Tai brought a rolling board and a rolling pin to the class. Children started to talk even before Tai had a chance to say anything. They were reminded of many things in their homes and they talked about them. Tai then suggested that children write about these things. She had already written a few words from the children's discussion on the blackboard. Children also started to write. Children were engrossed in writing for more than half an hour. Tai introduced some new words and phrases such as 'fluffy chapati', 'nice smell' and wrote them on the blackboard.

One day a student announced excitedly that a cat was sitting behind the door. Picking on this learning opportunity, Tai, made the cat the day's Guest of honour. Children felt her fur, fed her, tried to talk to her. The cat ran away in a few minutes, but the children had found an interesting topic to talk about and to write on! Such incidents can create interesting writing topics. Pictures, poems, songs, food, people, books, letters, puzzles, advertisements, news and jokes are wonderful topics to write about.

There are many types of writing.

Instructions, messages, jokes, experiences, description, letters, poems, songs, stories, what will I do if (problem solving), skit, planning, informative writing, report writing, essay writing are categories that should be introduced to children while learning the language. This section includes writing activities for children in the early stages of literacy.

# Creative writing

Once children have grasped enough technicalities to write words and small sentences, they should be led to the wonderful world of creative writing. Writing is a simple and normally used, yet important medium of expressing one's experiences and feelings.

One should feel like writing something, the desire to write should come first. For this to happen, an external nudge might be needed. A topic that is close to children's heart or of their interest can attract them. Once children start writing, they should find enough space, time and quietness to explore their imagination. They should also get the opportunity to read out their written matter to others.

This requires an atmosphere free of stress and fear in the classroom. Tai should think of creative topics for writing. For example, 'After the school reopens', 'After the vacation, 'etc. The topic "What did you do in your vacation?" is quite common, but children who have had the opportunity to share their experiences through speech and writing can be given a topic such as "What did I miss doing during the vacation?" This topic is more interesting for them!

Children respond differently on the levels of emotions, thoughts and comprehension. For example, when asked to write on the topic of "An hour in the life of a caged bird," as if the bird is writing a diary, one child might write about the bird's feelings and thoughts, while another might focus on the movements and habits of the bird or someone else might highlight the bird's loss of freedom. The expression of each child is different and Tai should respect and accept it.

**The tomorrow I want**

"Red sun…
Green fields…
Blue sky…
A peaceful home…
No one shouts
No fight between mother and father
No fight between brother and sister"

**Payal Jadhav, Grade 5**

**Using objects!**

Using objects is a very useful tool to attract children's attention and trigger their feelings. A small clue provided by using objects pushes the child to think further about speaking and writing about it. This activity proves to be very interesting for children having a level of understanding of ages 9 and above.

The first stage is quite easy! It encourages children to speak. We can display a variety of objects, for example, a bell, a watch, a stationary box, a book, a butter churner, a pen drive and so on. The child chooses any one object. In the process of choosing an object, the child unknowingly starts to have a conversation with the object in her mind. Now the child speaks or writes about the object. To push the conversation ahead, we can ask a few questions, such as -

1) Why did you choose this object?

2) What did you like about this object?

3) What is this object made of? What is its shape, colour, texture like?

4) What is its use?

5) What else do you know about this object?

Children who are not used to speaking in front of a group find speaking about the object to be easier. This activity creates confidence in children about speaking in a group.

For children who have not yet reached the level of writing sentences, a different activity can be conducted using objects.

Children sit in a circle around 10-15 different objects. They are asked to observe the objects for a few minutes and then the objects are covered. Children are asked one by one to remember and name the objects. Names should not be repeated. They are asked to stretch their memory and recall all the objects. Tai writes the names on the blackboard and asks children to read them. Then she wipes the blackboard and asks children to reproduce the list in their notebooks. As the next step, children can use the words to write sentences about each object.

Children with advanced skills can be asked to write down the names of as many objects as they remember immediately after covering the display. This builds confidence in their memory when children realize that they remember more objects with each trial.

The rules of good writing

Have something important to say, something useful for everyone or at least for many. Know for whom you are writing. Gather all the useful materials. Find a logical pattern with which to develop the theme. Eliminate the words that are not needed. Eliminate the words that are not used in the spoken language. Never set time limits.

**-Letter to a Teacher,**
**The School of**
**Barbiyana**

Once children start to observe keenly, we can include small objects such as buttons, needles, tacks, u-pins, erasers, coins etc. The number of objects can also be increased to around 20.

Some preparations are necessary before conducting this activity with objects –

- The choice of objects should be thoughtful. They should attract children's attention. A mix of familiar objects and some objects of bygone days can be done – for example, a container for Kumkum, paan holder, old style h and-mirrors, stone grinders, etc.
- Objects should be kept covered till the actual activity starts. This unknowingly creates curiosity about the covered objects.
- Objects should be arranged attractively in a plate or a tray for display. They can even be arranged on a banana leaf! The cover should also be attractive, like a beautiful scarf or chunni.
- We can create sets of different types of objects, so that our choice becomes easy before the activity.

Objects can give rise to many language activities. Let us take an example of a bell.

- Drawing a bell. Speaking and writing about a bell
- Writing an autobiography of the bell
- Understanding scientific principles of sound and metal
- Making a list of words or phrases related to the bell. E.g., tinkling bell, tolling bell, bells and whistles, alarm bell, to bell the cat, a bell which doesn't ring and so on. We can create sentences and stories around these phrases.
- Uses of a bell – in the temple, on the fire engine, in the school etc.
- Speaking and writing about different forms of a bell which can be seen these days.

We should insist that children develop a habit of reading what they have written and making corrections as needed.

**Conversations between objects**

Two children choose an object each and imagine what the objects might converse about. Then they present a small skit on it. Children can also write imaginary dialogues between those objects. E.g., dialogue between bindi-comb, needle-thread, paper-a pair of scissors. Enacting and watching such skits is a lot of fun for all. Children think about the usage and the specialties of the object, reflect on the feelings of those objects and present it through their own expressions. It reflects their mind as well!

**Expansion**

Children's writing should be creatively used in the teaching process. It is extremely important for Tai to understand what the child wants to say because that gives direction to the next work to be done with the child. It is important to do so to understand the obstacles that the child faces in learning and how to do away with them.

- Children should rewrite the matter on a ruled paper after correcting mistakes from the earlier draft. They can also draw pictures to beautify their papers. We can create a poster or a small booklet by compiling their writings.
- Writing and speaking are the child's expressions. We can display this on the pin-up boards.

Wrapping up the session….

What did we do in this activity?

- What new words did we learn?
- What new information did we collect?
- What did you understand about yourself through this activity?
- What did you understand about others / Tai through this activity?
- Did you have fun? What was the best part of the activity?
- How is the activity useful for us?
- What new things did we learn?

Are some questions helpful to guide the discussion.

### Letter writing

Letters are a private conversation between two people. What is difficult to express in speech can be expressed through letters. Children can write letters to their friends, parents, even movie actors! Writing a letter to an inanimate object is also a fun!

### Letter to an object

Objects that catch the children's attention (e.g., a doll, a piece of jewelry, a beautiful box, a peacock feather, an attractive pen etc.) can be kept covered in the center. Tai gives instructions for the activity and uncovers the objects. Children choose one object each and write a letter to that object.

After writing, they give their letter to the child on the left. The child who receives the letter imagines that she is the object and writes a reply for the letter. Children read the original letter and the reply in pairs. This activity of creative writing is extremely enjoyable. It creates a window for others to peek into each child's personality.

## In the wonderful world of stories…

**Tell me a story…**

While telling a story, pausing and asking the children what will happen next gives a boost to their imagination. After reading a story, children can be encouraged to think using the following ideas.

- Change the ending
- Suggest a suitable title for the story
- Extend the story
- Draw something based on the story
- What did you feel after reading the story?
- What would you have done if you were in place of a particular character?

Children can be asked to write about many such points. Using a given story supports them to build the imagination required to write an original story.

**Story based on pictures**

Children who cannot yet read can be given picture books for a group of 3-4 children. Tai should help them to create a story using the pictures in the book. After they start to read, we can use books from other languages for this activity. English story books are easily available. After children create the story from the pictures, Tai can narrate the actual story.

**Enactment**

Children enjoy enacting a dramatic story or a lesson from the textbook. They get engrossed in the casting, script writing and direction of the play. This activity is very useful in understanding the purpose of the story or lesson from various angles.

**Writing stories**

Writing an original story is a complex skill. An example from Khelghar seems apt here.

We conducted a four-day story-writing workshop for children in grades six and seven. Three excellent stories were chosen for the workshop. Each session started with a read-aloud session of a selected story. Day one included the read-aloud session, writing a review of the story, enactment and drawings related to the story.

The second day included the read-aloud session followed by discussion about "What is a good story?" Children came up with interesting points with the help of Tai.

- The story should catch hold of our attention and should be appealing.
- It should sustain curiosity of what will happen next.
- The language should be simple, not complicated.
- We should relate to the story or references to things related to us in the story.
- Something should happen in the story.
- A problem should be created and later resolved as well.
- The story should not have a sad ending.
- It should make us laugh.
- The conversation should be in day-to-day language. The dialogues should take the story ahead.
- It should have a twist! The story should be unpredictable.
- The relationship amongst the characters of the story and their feelings should be expressed in the story.
- The beginning of the story should grab the attention as that decides whether the reader continues to read/ listen to it or not.
- We should avoid a plethora of characters and events. Only those characters necessary to the storyline should be included.
- The story should enable us to paint a picture in our mind about the people and the places portrayed in it.
- Good people in the story should get good rewards.
- There need to be a logical link between the events of the story.

Children came up with most of these points and Tai added a few.

Children were eager to write their own stories after this discussion. Tai had placed 'triggers' in four corners of the classroom, namely, a bottle, a stick and a mud pot in one corner, a poem in the second, a few pictures in the third and a matchbox containing a coin, a needle, a ring and a dice in the fourth corner. Children could choose the triggers for their story. Children were soon engrossed in writing.

On the third day, children had to write a story without the support of any external objects or triggers. Tai wrote, "It so happened…." on the blackboard and children suggested topics to write on

It so happened that…

- There was a big fight in the house
- There was a flood in our basti
- Rahul failed in the exams
- I escaped a major accident

Children choose a topic they liked and wrote their stories.

On the fourth day, Tai suggested a few topics for the story.

- The moon tripped on a cloud and fell
- A small boy observed that an old man was picking something up on the hill and putting it in his bag.

Both these topics were beyond children's familiar world, but still children were able to write on these topics.

Here is the story written by Pranjal Kamble.

"There was a small village. Many people lived there. One day, the moon tripped on a cloud and fell into this village. Everyone was surprised. Children were overjoyed! Brightness spread everywhere. The moon was scared. It was all quite new for him. In his house, everything and everyone was round, but here there were big children, men and women around! After a few days he became familiar with the people. He started to play with the children. One day the children were playing cricket. A boy got hit with the ball during play. The moon was scared. He did not know what should be done, which medicine to apply if someone gets injured. He rolled towards the child's mother and told her what had happened. She came and took the boy to the hospital. The moon was relieved and so were the other children."

Tai was very proud that children did not hesitate while taking up the challenge of writing stories.

Even though the stories were not completely according to the criteria that children had come up with earlier, it was clear that they had found the right direction!

**Some creative topics**

There are many abstract thoughts and emotions in our mind. Sometimes we are not aware of these.

**My morning.**

The front yard was filled with the fragrance of rain. Flowers were blooming. The birds were singing. A little rabbit hopped here and there. I started to play with it. Soon, Rani arrived and said, "Are you still playing? Don't you have to go to school?" I said, "You go ahead, I will follow you." I resumed playing with the rabbit. I kept playing until it was past time for school. My friend came back in the evening and asked, "Are you done playing with the rabbit?"

**Rutuja Bhadke (Grade 5)**

We bury our dreams, hopes, desires deep within while facing the daily grind of work and life. It is difficult to express our abstract thoughts when someone asks what we feel. Hence, if we can present children with topics that test the boundaries of the possible and the impossible world, they willingly enter the world of abstract thoughts and express them.

For example, we can put forth the topic "At the stroke of midnight on a no moon night" and ask children to brainstorm about it. If children find it difficult to present their ideas, we can ask them to come up with words that are related to the topic. E.g., dark, quiet, eerie, graveyard, fear etc. Tai should write these words on the blackboard. Now children can use these words to express the abstract ideas in their mind. They can draw or talk about the topic first. Their drawings and writings can also be exhibited. There can also be a constructive discussion about each other's writing.

**A few ideas**

- What if we can read others' minds?
- 5 things that you will never refuse children when you grow up
- What if you lose your way in a dark forest?
- If the garden becomes alive, what will it speak to you about?
- You wake up one morning to find that you have turned into an animal/bird. What will happen then? What might have happened? How will you come back to your original form?
- A locked room holds a mystery. What might it be?
- Draw a fruit that hasn't been discovered yet. Give it a name.

Children get weary of textbook lessons, poems, question-answers, essays, grammar, letter writing and such typical activities conducted in the language lessons at school. Ideas that are related to their life and are new, rekindle their interest in learning the language.

**Topic-based writing**

Children need help to reach the stage of writing an essay on a given topic. Let us take the topic of 'Exams' as an example.

Children are asked to sit quietly with their eyes closed for a few minutes. They are asked to note which words related to exams come to their mind. They tell those words to Tai, who writes them on the board. She categorizes them while writing, e.g., nouns like pen, question paper, answer sheets or adjectives like difficult, tiring, irritating or verbs such as writing, remembering etc. The discussion continues about experiences of exams, pros and cons of exams. Tai can suggest some phrases and idioms, poems and songs related to exams to help their writing.

Then she explains the detailed technique of writing an essay. Writing the beginning, middle and end in such a way that the reader becomes engrossed in the essay, writing small but complete sentences, using correct punctuations are some techniques that need to be taught. If the topic is closer to children's emotional world they enjoy writing about it. E.g., balloons, clouds, fragrance etc.

Everybody should read out their writing.

Tai should note new ideas, graphics, usage of apt words and expression of emotions in the essay. She should point out these things in the group.

Essay is an intrinsic part of language examinations. Our aim is to try to free the essay-writing from the typical pattern and make it more creative. We can communicate with children to take their writing from 'What examiners like' to 'What I feel'.

Children's dialect should be accepted in free writing, whereas the standard language should be insisted upon for formal question answers.

'Chitrawachan' From Jyotsna Prakashan  Figure - Madhuri Purandare

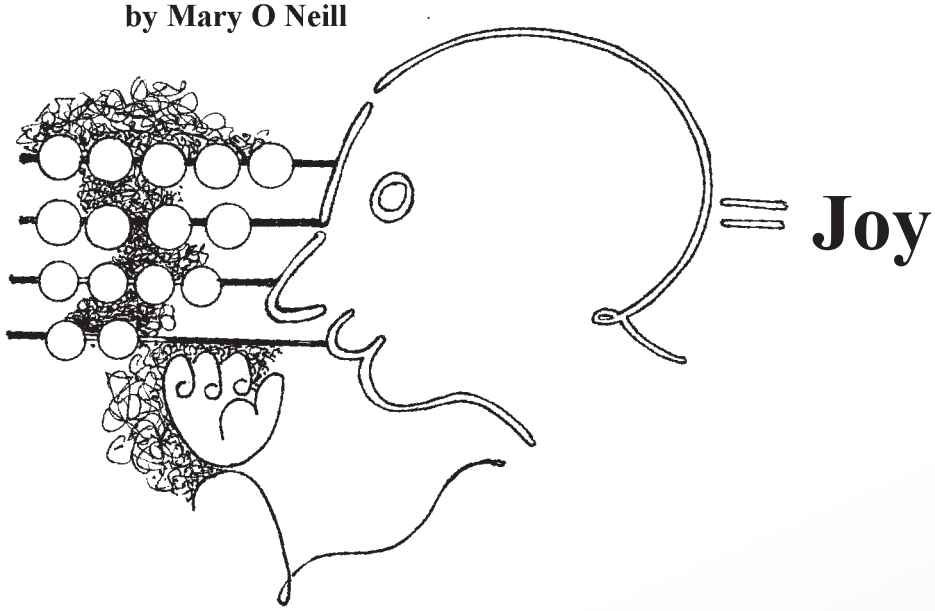

24/8/2015
मणी मोजा
कार्ड जोडा!
93
Smile

# Mathematical Harmony

## Take a Number

Imagine a world
Without mathematics :
No rulers or scales,
No inches or feet.
No dates or numbers
On house or street.
No prices or weights,
No determining heights.
No hours running through
Days and nights.
No zero, no birthdays.
No way to subtract
All of the guesswork.
Surrounding the fact
No sizes for shoes,
Or suit or hat
Wouldn't it be awful
To live like that ?

**by Mary O Neill**



# Journey of Mathematics/ On the path of Mathematics

## Relation of mathematics with life

From the morning when we wake up till we go to bed at night we are bound by Mathematics, like what time to wake up, how much time is there for cooking etc. In order to complete all the tasks of the day we have to decide the order and the speed with which we need to do the jobs. Questions like, for one litre of milk which bowl/ container to use, what is the shortest road to reach office on time, how to manage the monthly expenses etc. have to be answered. To answer all these questions at home or outside we knowingly or unknowingly use the operations of Mathematics. For example: Construction of a building – what is the area of the plot? Storage in a shop – How many sacks can be stored? Lunch for 100 people – what quantity of each grocery item to buy? What will be the expenditure/cost? We come across such examples in our daily life. There is Mathematics in nature also! Sunrise, Sunset, Seasons, Blood pressure, Heartbeats are a few of such innumerable examples. All these natural phenomenon occur in a systematic way. So Mathematics is everywhere and is an inevitable part of human life.

Yet why many people are afraid of mathematics? If you look around carefully you will find many people who are not educated but still can do accurate calculations and that too orally! A carpenter knows how to make the shelves of a cupboard with parallel, vertical and horizontal boards that are at right angles. A mason checks the horizontal and vertical level of his work with the help of a spirit- level or a plumb. How do they do without learning Mathematics in schools? The answer is very simple. All this is related to their job requirements based on their experience. This same problem appears difficult when it has to be visualized and solved on a paper.

Many people find this journey from concrete to abstract very difficult.

We all observe nature every day. We observe that the sun rises earlier in summer than in winter. But just observation is not sufficient to calculate the exact time of sunrise. For that we need to know some mathematical concepts. It is necessary to know the axis of the earth, the time it takes to revolve around itself, the time it takes to orbit around the sun to calculate the exact time of sunrise. Mathematics is necessary to write the observations accurately and systematically, prove them and check the results. Approximations based on observation and logical deductions can be checked by numerical methods and formulations. Many laws of nature have been derived by using this method. So Science and Mathematics work hand in hand.

While learning Mathematics students have to learn many abstract concepts. The concept of 'number' is itself abstract. '5' is a number symbol, it may represent 5 things or 5 people. When the children actually see 5 things it becomes easier for them to understand this abstract concept.

If the mathematical concepts like Arithmetic, Algebra, Geometry, Graphs, Organization of data are taught by relating to the life experiences of children then it becomes easier for them to grasp and understand.

(Vetted by Sunita Shirguppi)

## Mathematical Abilities

Study of Mathematics develops the ability of children to think logically and also to use mathematical methods to understand a problem. For example,

1. To analyse the problems numerically
2. To understand the shapes – 2 dimensions (perimeter, area), 3 dimensions (surface area, volume- capacity).
3. To draw a proper conclusion by precise, logical and clear thinking.
4. To do abstract thinking and understand the abstract concepts.
5. To pursue and prove results based on observations.
6. To understand the given formulations and also to formulate.
7. To do proper estimation

These abilities are useful to understand problems in our daily life and also to think objectively to solve them. Let us see some examples.

1. I have two plots of land ABCDE (Fig1) and PQRSTU (Fig 2) and I have to decide which is larger. Simple observation alone may not be helpful to identify the larger plot and also to convince the same to others.

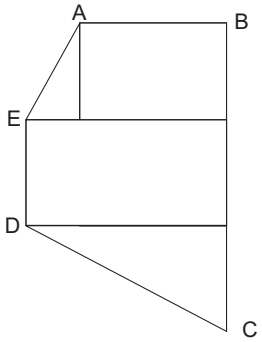
   I have to find the areas of both the plots to identify the larger one.

   As shown in the figure, I will have to divide the plot in rectangles and right angled triangles, find their areas and add them, compare the areas of both the plots and then determine the larger of the two.

   This means I have to use mathematical operations and formulae to find the area and then to determine the larger plot.

2. Suppose in ABCD (Fig 3) I am standing at the corner A and I have to go to the opposite corner C. We all know that the shortest distance is along the diagonal

(Figure 1)

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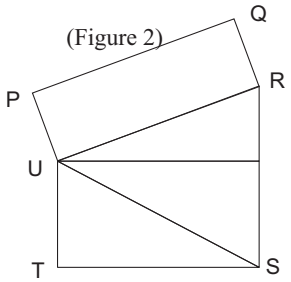
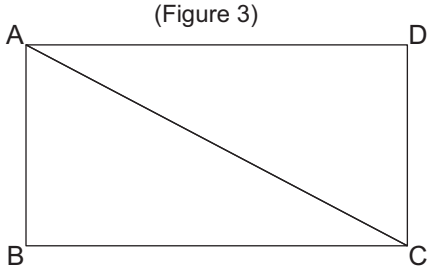



(Figure 3)




and not along the edges.

This means AB + BC > AC

Now whether it is true only in this figure or for any triangle, it has to be verified and proved. This leads to the result that 'The sum of any two sides of a triangle is greater than the third side'.

3. If you have to buy something on instalment from a shop, then you will have to find out the actual cost, instalment amount, period of instalment and calculate the interest rate. After comparing the effective rate of interest on the basis of information obtained from different shops you can decide from where to buy.
4. We often come across problems related to finding the area and volume by using various formulae in Geometry. For example, material required to make tin boxes and pipes. Carpenters, Masons, Painters,

Many institutes like Navnirmiti, Grammangal, Homi Bhabha Science Education Centre, Quest, Eklavya from Madhya Pradesh have done elaborate study of Mathematics and Science. They have also developed many teaching learning material to teach and learn various basic concepts in Mathematics. Palakneeti Khelghar has been using these Navnirmiti products and methods from the very beginning for effective teaching. The workshops conducted by Navnirmiti have been very useful to Tai's from Khelghar

Stone breakers have to be paid as per the area (per sq.ft) or volume (per cu.ft) and they all understand this method of calculation.

Many a times the teachers find it easy to teach the techniques of solving Mathematical problems. But they find it difficult to explain the basic concept and to develop the ability to solve a problem. Hence it is necessary to work on this problem. It is important to understand why a child finds Mathematics difficult Therefore, it is important to know the methods to understand child's difficulties. Henceforth we will be discussing many such points.

## History of Mathematics

Learning mathematics will be a joyful and fun filled activity if we know how it was developed based on the keen observation of nature and human interactions. Let us see the glimpses of history of development of mathematics through the ages.

Mathematics is believed to have come in existence about 4000 years ago.
Foundations of Mathematics were laid by noted mathematicians from all over the world, Ancient India, Egypt, Arabia, Greece and Europe. Indian mathematicians were leaders in the study of planets – stars in the sky (Astronomy). Ancient civilizations of India, China and other countries developed their own methods of writing numbers. Indian mathematicians have given the world the most innovatively developed method of writing any number with the ten digits 0 to 9 and each digit having its own value according to where it is placed (place value) in the number.

Our great Indian mathematician, Brahmagupta brought about a revolution in the world of mathematics with his concept of 'Zero'.

We can guess from our daily life how Mathematics might have developed.
Measuring time, land measurements, defining borders of land, counting cattle cows – buffaloes, counting herds of sheep – goats, measuring agricultural produce, trade and commerce, exchange of money and calculations, all these activities needed the knowledge of numbers.
It was tedious to use stones and sticks for counting, so once people were able to write, they started using symbols for writing the numbers. Negative numbers were used to show transactions of loans. Geometry must have been developed through the relationship between man and nature. The idea of 'point' must have come from the stars shining at night in the sky. The 'straight line' must have come from the rays coming through the leaves in trees. Shapes of the leaves, flowers, beehives and other natural surroundings gave rise to the basic concept of geometrical figures like triangle, quadrilateral, pentagon, hexagon, circle etc. Leaves, flowers of similar shape but of different size could have resulted in the concept of similarity whereas the design on the two wings of a butterfly is an example of 'symmetry'. People of the ancient civilization were aware of the positions of the various stars, planets and constellations. They also realized the regularity in the speed of the movement of the planets. They used this knowledge for their daily chores and routines. Time was measured from the movement of the sun and moon. Thus the 'calendar' came into existence.

Mathematics is not just numbers, signs and calculations but the basic concepts inherent to it. The progress made in many subjects like Physics, Chemistry, Engineering, Computers is based on the progress in Mathematics. If you want to know this beautiful world and the science behind it then you must make friendship with Mathematics! Isn't it so?

## Obstacles in learning Mathematics and their solutions.

**Some prejudices:**

"Failed in Mathematics? Useless!"

"Girls are just rote learners, they will not be able to do calculations"

Due to such prejudices, children have a very negative attitude towards Mathematics.

If I fail in Mathematics I am not clever, I will never be good at mathematics. Such thoughts create an inferiority complex in the minds of children.

Actually, children learn only the techniques to solve a problem and not the Mathematical concept behind it. This creates fear of Mathematics in their minds.

If the basic concepts of the children are cleared right from the beginning and they are taught as per their inclination, enthusiasm and speed instead of meaningless calculations, then they will get the joy of understanding and solving. Once they have the confidence, they will like to learn mathematics and they will be free from their preconceived ideas. Their prejudices can be addressed and changed through a meaningful dialogue.

**Tedious Calculations**

If the children have to do tedious calculations before they fully understand the concept then they are unable to focus on learning. Instead, they get pressurised and have difficulties in learning.

While teaching new concepts, the problems should initially have simple calculations. If the children can deal with simple problems independently and with confidence, if they can do addition, subtraction, multiplication, division and understand the concept of fractions, then they will be able to use these concepts properly to solve difficult problems. Mathematics is not just calculations. Once they understand what is to be done then they can also solve the complex problems.

**Mathematical language**

Every subject has its own terminology. Children do not understand the Mathematical terms like dividend – divisor, perimeter, place value as well as the concept behind such terminology which creates difficulties in their learning. If their mother tongue is different from their medium of learning then it becomes all the more difficult for them to follow this terminology.

If the children do not understand the meaning of a word, the word seems very strange and vague to them. They cannot visualize the concept conveyed by that word.

Right from the beginning, Mathematics has to be taught without haste and the concepts should be made clear with the help of objects and the teaching- learning materials which will help the children to grasp the Mathematical terms and language. This understanding of simple concepts forms the base and helps them to study Mathematics better.

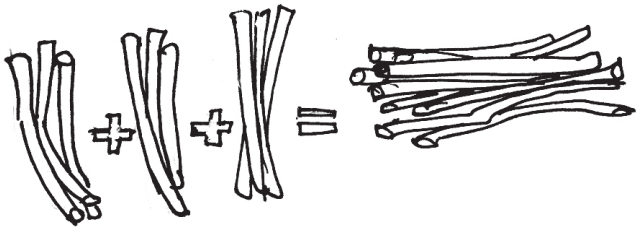
Most of the concepts in Mathematics cannot be taught independently. Many of the new concepts have to be taught with the help of previously learnt concepts.

For example: Learning division: It requires the knowledge of numbers, relation between numbers, place value of numbers, subtraction, tables of 2 to 10. For the divisors greater than 10, the method to form a table using addition or multiplication. If the child has not understood or forgotten any one of the above functions, he will not be able to do division.

To avoid this situation it is necessary to give sufficient time to understand and apply the basic concepts. A lot of practice is necessary and the teacher should proceed to the next concept only after making sure that the first one is very clearly understood. Before teaching a new concept, it is necessary to check the necessary previous knowledge or skills. At every stage of teaching a new concept it is necessary to revise and practice the previously learned concepts.

## Care to be taken while teaching Mathematics

### From things to numeral language



For the children to understand, apply and enjoy Mathematics, it should be taught with the help of things, pictures and activities. Objects like small stones, pebbles, seeds, marbles, beads, sticks from a broom, any such things which are easily available in their daily life or around them can be used to teach mathematics. New teaching learning materials can be prepared with the help of the children. In addition simple songs, stories, puzzles, games linked with maths are also very useful and children enjoy them. Once they understand the language of Mathematics it is easy to steer them towards the abstract concept of Numbers.

### Teaching should relate to children's experience

Children always share their food with their siblings, some children help their parents in their petty business, and they are also able to deal with calculations related to that activity. If they are able to relate what they learn in school with what they use in daily practice and if they can write their actual daily transactions in the school notebook then it will be easy for them to relate school mathematics and the actual dealings in their daily routines and they will enjoy the whole process. If the teaching of mathematical concepts and formation of word problems is related to their real life experience then they will automatically start thinking about mathematics. For example:-

- For children of Grade 1:- We may start with ' get one balloon', 'count the number of children and set the plates'
- Relating word problems to their experience like :-
  (1) $4 - 1 = 3$.
  'There were 4 balloons; one of them bursts so how many remain?'
  (2) $37 - 6 + 8 =$ …….
  'There were 37 people in a bus, at one stop 6 people got down and 8 people got into the bus. Now how many people are in the bus?'
- Symbols for numbers is an abstract concept. But if it is related to real life experience then it becomes meaningful. For example the digit '8' does not create any images in our mind. But if we say that Laxmi scored 8 marks then it helps them to understand its meaning.
- Rate cards of hotels, general stores ration shop, tickets of bus or train, rates and weights used in vegetable shops, food grain shops, coal store, ice factory, jewellers shop etc. are very effective means which link Mathematics to our daily life.
- Starting with simple things like 'In how many ways can we get change of Rs 10?' 'Whose classroom is bigger? Yours or theirs? Why?' and then gradually introducing more complex transactions in our life will make mathematics more relevant and meaningful.

### Teaching Mathematics in Khelghar

While teaching Mathematics in Khelghar it is necessary to think differently. Children in Khelghar come from deprived sections of society and hence their needs are also different. Children in Khelghar are deprived in many ways, hence they are not interested in studies. They find the abstract concepts in mathematics very difficult. It is a challenge for them to understand mathematical concepts, apply them to real life experience and further develop their thinking.

In Khelghar, it is likely that children of the same age group may have different levels in their capabilities, speed of understanding and needs. Hence if Tai/Dada makes 3 groups of children as per their ability then they can have different objectives for each group. It is possible to design activities of different difficulty levels as per the capability of the children in the group. Some of the activities for the group should be such that they help in developing the abilities of all the children in the group. Therefore, some activities need to be planned considering different levels of understanding in that group.

## Introduction to Mathematical Concepts

## Preparation for Mathematics

Before introducing the children to Numbers, they must know the meaning of some words used in mathematics and the concepts related to these words. Actually children do know these concepts from their own experience, but all the same it is better that they are formally introduced to these words and concepts. It is later useful while learning word problems, algebra and geometry. Some activities are given below to clarify these concepts.

**As much – As many**

- Tai shows her fingers and says "Clap your hands as many times as my fingers are shown."
- Draw as many circles as the number of fingers I show with my left hand and as many triangles as the number of fingers I show with my right hand.
- Each one of you take as many seeds as I have in my hand.

**Above – Below**

- Ask which things are there above and below the table, cupboard and mat.
- Ask them about the objects around them whether they are above or below something (e.g. Table).

  Once they understand this concept then later it will be easier for them to follow the Coordinate geometry and the concept of Axes.

**Left – Right**

- Tai should face the blackboard just like the children. "Left hand up, right hand up, left hand down." Tai should give such instructions and do them herself so that the children will also follow her.

Tai should gradually increase the speed of the instructions so that the children will also be doing the movements faster.

The concept of Left – Right is later related to the concept of Number line and Equations.

**Front - Back**

- Tai should ask the children "What is in front of you? What is behind you?"

  Children and Tai should make a list of all such things.
- "Look in front, look back, hands in front, hands at the back."

  Children should do the movements as per the instructions given by Tai.

**Big-Small**

- Draw a straight horizontal line on the board. Then draw five-six small and big trees on that line. Then ask children 'Show the tallest tree, show the smallest tree'
- Ask children to stand in a group of three and then ask them to stand in a line as per their height.
- Ask children to check what is small, the table or the stool.

**Long – Short**

- In the classroom keep some pieces of rope, wool, and thread of different lengths. Every child will pick up one piece and compare it with the piece with the other and tell which one is longer and which one is shorter.

**Far – Near**

- Tai should ask in the class "whose house is nearer to Khelghar? Ratna's or Anand's? Tai can then ask, "What is nearer to me, the blackboard or the door?" The children will check and answer.

  This concept is very useful in drawing Maps.

**Order – Before – After**

- Tai says to the children "I will do some actions and you have to guess what I am doing."

  Tai will mimic the following actions and sounds, pouring water in a vessel with the sound of water, adding sugar, squeezing a lime, stirring it, pouring the sherbet in two glasses, and drinking it.. Tai will then ask, "What did I do first? Next?

  What was the order of all my actions?"
- Similarly, Tai can ask about the sequence of the work done in the morning like making tea, making roties etc. In this manner ask the children about the sequence of various such activities.

  This concept is very useful in measurement of time and also writing stories.

**More – Less**

- Tai will tell the class, "Today, count the number of girls and boys in the class. The one who are less will do painting and more will do artwork."

  If the children are unable to count, Tai should pair one boy and one girl. Some boys or girls will not have a pair. This will help the children to understand who are more- boys or girls.

- Arrange some leaves, flowers, small stones in groups. Ask the children to find which are least.

  This comparison forms the basis for subtraction.

**Order - Small to Big**

- Tai should distribute some sticks of different lengths to the children. Then draw a horizontal line on the floor. Ask the children to arrange their sticks as per the length of their stick keeping one end on the line.
- Distribute leaves or stones of different sizes to the children. Ask them to arrange them as per their shapes, from small to big.

## Knowledge of Numbers

Even before the children start schooling and formally learn Mathematics they are already aware about it in their day to day life. They insist on having the same number of things, clothes, sweets, toys as their siblings (brothers and sisters). They can count the number of family members, plates and cups. They also learn to handle money while buying things from a shop.

Children should be taught Mathematics by relating it to their real life experience.

The symbols for numbers should be introduced with the help of things, actions and pictures. This will give meaning to these abstract number symbols and they will be able to use Mathematics in their daily life. Thus Mathematics will not remain abstract and technical for them.

In this part the basic mathematical concepts and activities based on them are discussed. It is essential to make maximum use of such activities and TLMs to teach the children the concept of numbers and operations on numbers.

**Language of objects:** blocks, beads, seeds, shells.

**Language of actions:** standing, jumping, showing fingers.

**Language of Sounds:** clapping, snapping fingers.

**Language of pictures:** showing and drawing pictures as per the numbers.

**Real life experience:** Examples from their surroundings and their experience.

Like - 'look for things in your classroom which are 3 in number '.

**Number symbols :** Once they have learnt the concept of single digit numbers using the above methods then only introduce them to the 'number symbols .

**Before introducing Numbers**

- While using different teaching learning materials and games it is important that the children enjoy and have fun.
- Many children coming to Khelghar may not have done pre-schooling, so they may be restless and may not be able to follow the given instructions.
- Many times children do not understand the instructions and hence are unable to follow them. So while giving instructions it is necessary to first show them the action and then practice with the children. For example the game Simon says,' …...'
- Children in the age group of five to seven cannot play any one type of game for more than ten minutes. Hence while teaching mathematics it is necessary to be prepared with different types of games and activities.

Lastly after they are fully familiar with numbers then teach them to write the numbers.

**Activities and games should be taken using different kinds of objects, sounds or body movements**

**Children love and enjoy them very much. Linking all these methods helps the child to fully understand the concept of numbers. For example – 'Take as many beads as the fingers shown by me.'**

Some activities for number familiarity are given below. These activities involve different languages stated above such as, language of things, actions, pictures, sounds, number cards etc.

**Teaching numbers from One to Five**

By the time children start schooling they are already aware of numbers from one to five in the form of various objects. Hence first teach numbers from one to five.

Activities to teach the number 'one' –

- Place leaves/ flowers/ stones/ seeds/ sticks etc. in front of each child. Tai should pick up anyone of the things, for example: Pick up one leaf, hold it up and say loudly ' one leaf ', then the children will also pick one leaf and say ' one leaf '.
- Tai should show one finger and say loudly 'one finger', then the children will also follow and hold up one finger saying aloud 'one finger'.
- Tai would ask 'What is one in number on our face?, children will answer the question.

# *'Pohe'*: That too In a Mathematics class!

Some activities related to the daily life of the children can be undertaken in the classroom, so that the children find Mathematics easy and simple.

For example:- For children of grade five/grade six, the activity is of preparing *'Pohe'* in group.(Pohe –snack prepared of flattened rice)

All children should discuss together and make a list of activities to be done and the ingredients required. Make three groups of children, one group to purchase the required ingredients, second group to prepare *'Pohe'* and third group to clear up things after eating. Preparing *'Pohe'* together and relishing it together is an enjoyable activity but we want to relate it to Mathematics. For doing this let us refer to the following points.

Write the following types of questions on the blackboard and ask each child to read them.

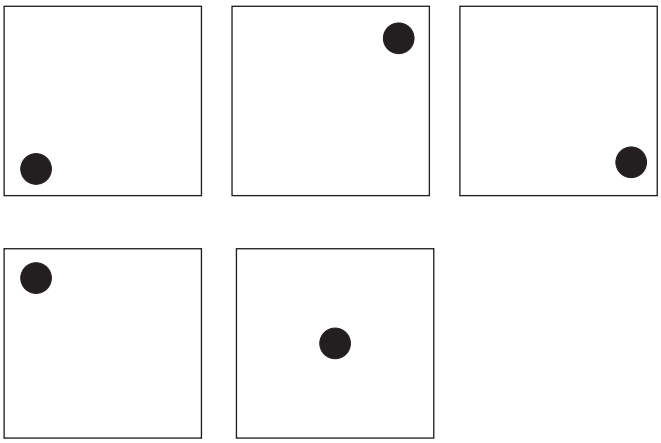
"Today we are preparing *'pohe'* for twenty children. If one child needs one fistful of *pohe* and one small onion then how many fists of *pohe* and number of onions do we need? Weigh one fistful of *pohe* and then find the approximate weight of *pohe* required."

- Find the approximate weight of other items required like peanuts, onions, salt, chillies, oil etc.
- Make a note of everything in the note book. Make an approximate list of how much of each item will be required to prepare *'pohe'* and then purchase accordingly.
- Find the rate of each item like *pohe*, oil, onions etc, weigh them and find the total cost.
- Calculate the duration of time the gas has been used. If using the gas for an hour costs Rs10, find the cost of the gas used for making *'pohe'*.
- After the children have prepared *pohe*, count the number of plates. Discuss with the children about whether the quantity of *pohe* prepared was sufficient, extra or less and whether their judgement of quantity was correct or not. Each child should write all the details and costing in their notebooks. Ask the children to find the cost of one plate of *pohe* on the basis of the total cost incurred. Find how much one plate of *pohe* costs in the market. Discuss with them the reasons for the difference in these two cost. This will also help them to understand that the efforts of preparing and the time required to prepare *pohe* is also included in the cost.

This activity will teach them the concept of estimation in mathematics. They will also automatically practice division, multiplication, addition and subtraction.

This will also help them to understand word problems, relating them to daily transactions and the use of mathematical operations to solve the problem.

Such activity will build their confidence in Mathematics.



- For the practice of visual reading of number 'one', make cards as shown in the above figure. Tai should show one of the cards and the children will identify the spot on it and say 'one'. The spot on each card is at a different location so that the children understand that it is 'one' irrespective of its position on the card. Make similar cards for numbers from one to five.
- Place one seed in a match box and label it '1' on the outer cover. Show the children the symbol '1' and ask them to say 'one'. This will help them to relate one seed (object) seen in the match box, symbol '1' on the cover and the sound 'one', with one another.
- Ask the children to search and circle number '1' on a calendar.

Once they are taught numbers from one to five then it is necessary to practice these numbers for perfect understanding. For practice, conduct games like ' get me 2 sticks from the pile of sticks' or ' jump as many times as the number of dots on the dice.' Select any number from one to five, for example four! Now show the children 4 things, symbol '4', its name 'four', sound of 'four', doing some activity four times. This will help them to experience 'four' in different forms and imbibe its meaning.

After practicing the numbers one to five in this way, teach them to write these numbers.

Introduce the children to the number symbols both in Devanagari and English script. If they are being taught writing in Devanagari then also side by side teach them to recognize and say them in English.

## Some Important tips

For teaching Mathematics in a creative and joyful manner, some practices and ideas learnt through our own experience are given below.

- Use of things and examples from their daily life makes it easier for children to understand and also to remember. Solving problems using objects helps them to realize and correct their mistakes. So that they are not afraid of making mistakes.
- Daily practice is necessary for learning mathematics. But the children of Khelghar may not practice at home nor it is possible to teach Mathematics every day at Khelghar. All said and done it is important that the children fully understand the Mathematical concepts. We have solved this difficulty by conducting separate workshops for primary and secondary once every month for three consecutive days. As a result the children get lots of practice based on the concepts that have been taught.
- Children like to solve problems in a work sheet rather than in their notebooks. So the mathematics teacher should always keep lots of worksheets ready. While solving problems, the children get confused at some particular steps. The worksheets should be designed to give them more practice resolving such confusions.
- Many times it is necessary to teach the middle school and even high school children right from the beginning like numbers, addition, subtraction etc.
- These children do not like to be taught from the basics, they feel degraded. Hence start with problems from their present textbooks and revise the portion as per the need. For example while teaching Profit and loss, if the students are unable to do addition and subtraction then they realize the need for revising. Then they can be taught addition and subtraction.
- Due to lack of daily practice, the children tend to forget in the next class after a week's gap. It is important for the teacher not to get disheartened but to teach again with ample examples. Once they start solving problems they will recall what they have learnt in the earlier class.
- Many children strongly believe that 'As long as their answer is correct, the steps in between are not important.' Hence it is necessary that they understand the concept thoroughly and then solve the problems.
- Mathematics up to grade four is quite simple, so the teachers do not feel the necessity of training. But the basic concepts should be taught in an enjoyable and activity based method, so the teachers must undergo training.
- Many times, the Tai in Khelghar may not have clarity about some concepts. In that case the Tai should get her doubts clarified using tools and activities prepared by some organizations like Navnirmiti or Grammangal that are working on the methods of teaching Mathematics.
- The necessity of creating new TLMs should be periodically reviewed based on the needs of the children and the available TLMs and changes should be done accordingly. This will help the children to experience the joy of learning mathematics.
- Mathematical techniques, concepts and daily transactions are all interlinked with each other. Languages, science and mathematics cannot be separated from each other. Do not try to isolate them. For example, the project of gardening in Khelghar. The length and breadth of each flower bed, number of beds that can be created, number of seeds to be sown, number of days after which the saplings can be seen, how much they grow every day. Such changes are to be observed and the observations can be recorded using both Science and Mathematics simultaneously. Recording all these observations will also develop their language skills.
- Children should be encouraged to use mathematical TLMs. Let the children themselves do the activities and help them to evolve new ones.

Even naughty children love to use different TLMs and learn. Encourage them to talk about how they are using the TLMs. This will help them to learn the basic concepts thoroughly.

## Teaching the concept of 'Zero'

Concept of 'Zero' is the first step towards abstract learning. It is therefore necessary to be very careful while teaching 'zero'. It is important to understand the concept of something which is 'existing', to learn the concept of 'nothing'.

The concept of 'zero' should be taught immediately after teaching numbers from one to five. Children understand that if I have a few things with me and I give them away one by one, nothing remains in the end. This 'nothing' is called 'zero'.

Let children sit in a circle, give each child five leaves, five flowers, five seeds, or five stones etc. Tai should first count her five objects; children will also count the small pile in front of them. Now Tai, along with the children would start keeping aside one thing at a time, all the time saying loudly how many things are remaining. Do this activity until only one object remains. Now ask children 'What will remain if I keep aside this last object?' Their answer will be 'nothing', which will help them to understand that 'nothing' in mathematics is 'zero'.

## Teaching numbers six to nine.

Keep a pile of five items in front of each child. Tai would add one item to each pile and then count up to six. Children will also count six items from their pile. All the activities done for numbers one to five need be repeated for the numbers six to nine.

- Practice for numbers six to nine.
  Throw a die and ask the children to read the number on its face. Generally every die has numbers from one to six but it is possible to make your own die with any numbers like 0 to 5, 4 to 9. Dice can also be made in variety of ways like, with only signs or with only shapes on it.
  Write the numbers one to nine on the floor in any order. Tai will call out a number and children will go to that number and also jump that many times.
- Keep nine plastic bottles in a row. Child will throw a ball at it and count the number of fallen and standing bottles.
- Select any number card from one to nine and ask the child to get those many things.
- Teach the children simple number related songs.
- One, two, buckle my shoe
  Three, four, shut the door
  Ask children also to compose such songs.
- Make worksheets to pair the number of pictures and the number itself.
- Show a number card and ask those many children to come forward.
- Tai would slowly clap her hands without saying the number. Children would count the claps and then jump those many times. It is necessary that Tai stops after clapping so that the children can jump. It is not possible for them to count and jump simultaneously.
- Children would narrate a story. Like, there was one farmer, he had two dogs, three cows, …….
- Reverse counting. Children would sit in a circle. They would start counting from 'one' in any one direction. After reaching 'nine' they would reverse the direction and count backwards from 'nine' to 'one'. This activity is very beneficial for the children.
- Game : Storm and Ship
  Children would run in a circle and Tai would stand at the centre.
  Tai sings the song "There is a storm, strong wind is blowing, captain of the ship says 'four' people in each boat".
  The children would then form groups of four. Start the game again and keep changing the number each time.

Once the children grasp the concept of 'numbers', they would thoroughly enjoy such games.

**Equality, less than, greater than, concept. Use of the signs =, <, >.**

While comparing two numbers, they may have the same value, or one number may be lesser or greater than the other number.

When two numbers have the same value the sign '=' is used and it is said to be 'equal'. For example 3 + 2 = 5, read this as three plus two is equal to five.

Teach the children to read always from left to right.

Many times the children are confused between the 'less than' and 'greater than' sign. In that case, explain the meaning of the two signs. 'These signs are used to compare two numbers. These signs have 'one end' at one side and

'two ends ' at the other side. Point the 'two ends' towards the greater number and 'one end' at the smaller number.' After explaining this to children, practice using small numbers. For example, 6 > 3, should be read as 'six is greater than three'.

**(Vetted by Sunita Shirguppi)**

After teaching numbers from one to nine, the concept of addition and subtraction should be introduced. Practice simple problems of one digit addition and subtraction with the children. Explanation for addition and subtraction is given on page numbers 279 to 281.

## Ordinal numbers

There is a pile of 8 balls, this is a quantity of balls. Shweta took 5 balls from this pile, which means Shweta has taken a quantity of 5 balls.

Now arrange these 8 balls, one on each tile as shown in the figure given below.

1 2 3 4 5 6 7 8

Suppose Deepak takes the fifth ball. This means he has taken the ball which is fifth in the sequence.

When we take something in a particular order it is important to decide the beginning of the sequence and accordingly select a thing with a particular rank.

When Shweta takes 5 balls, then the number '5' represents a quantity and when Deepak selects the ball at rank 5 in the sequence then '5' represents the rank of the number in the given sequence.

For example, the 'roster' of students in the class represents a cardinal number where as each student in the roster has a particular rank that is ordinal number.

For the children to understand the concept of cardinal and ordinal numbers take some activities and games in the class. For example:-

Suppose there are 40 children in a class, make 4 groups of 10 children. Ask each group to stand in a line and give a rank from 1 to 10 to each of them. Make sure that each child knows its rank. Now ask them to do the following activities.

--from each group the fourth child should raise its hand.

-- from each group the sixth child should jump 2 times.

--from each group the fifth child should sit down

Similar activities can be conducted in the class.

## Concept of Tens

Now the children can count up to nine. Add one more thing to the pile of nine to make it ten. Practice this activity with children many times.

## Teaching concept of 'Tens' with the help of unit cubes and rod of ten cubes.

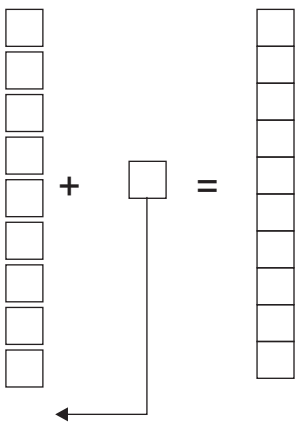
Understanding Place value becomes easier with the help of the simple aids of unit cubes, rods of ten cubes and plate of hundred.

Take a thick paper and cut out squares of the same size. Each square represents 'one' unit. Now cut out a rectangular strip of 10 squares as shown in the figure. It is important that each square is of the same size. This strip of 10 squares will represent a 'rod of ten'. Thus each rod will represent one 'Tens'

Unit cube Rod of Ten

## Concept of Tens

As shown in the figure, ask the children to place 9 unit cubes. Ask them 'What happens when you add one more cube?'. The children will answer 'ten'.




9 unit cubes + 1 unit cube = 1 rod of ten

Now ask them to place this unit cube below the nine cubes, also next to it place the rod of ten as shown in the figure below. The children should then check whether both are of the same length.

How to write the number ten? This can be explained as follows "Numbers 0 to 9 are written in the units place. Ten unit cubes makes one 'Ten', so we write '1' in Tens place and now nothing is remaining in units place hence '0' is written in Units place".

To understand Tens place, children have to understand the concept that 'a group of ten things makes one Ten'. Generally, children can count the numbers in sequence by rote but they do not understand its meaning.

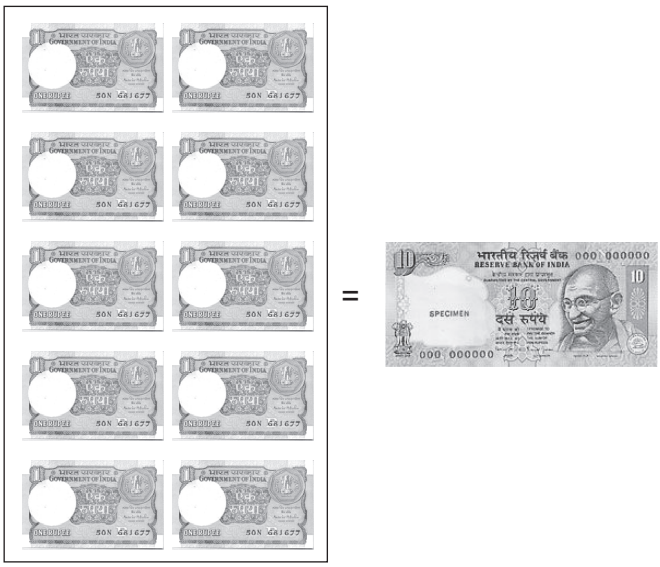
Therefore children are unable to recognise or write numbers in between, although they know the numbers sequentially. To understand the concept of numbers it is very important that they understand the concept that 'Tens' means a group of ten things and 'Unit' is a loose one thing or item.

## Teaching the concept of Tens with the help of currency notes

**Place 9 notes of Re 1 on a table.**

**Add one more rupee note.**
**Now there are ten one rupee notes.**

Ask children "What do you get for 10 rupees?"
They will answer – chocolate, pack of biscuits, pen etc.
"Can you buy any of these things with 1 note of Rs10 or with 10 notes of Re 1?"
"Yes of course! This means,



Ten Units = One Ten
To show this make a Tens place before the Units place.

| Ten's house | Unit's house |
|---|---|
|  | |
| 1 | 0 |

**Activities to strengthen the concept of Ten and counting the numbers after ten.**

- Place piles of flowers/ leaves/sticks/stones/seeds in the classroom. Ask children to count and make groups of ten.
- Card paper or plastic currency notes are available in the market or they can be made in Khelghar using card sheets. . Tai should give the children a Ten rupee note and ask them for change. They will count and give 10 notes of Rs1.
- Game of completing a Ten: Put a lot of sticks in the middle. Now each child will throw a dice by turn. According to the number on the dice, it will pick up the sticks from the pile. If sticks with a child are more than ten then it will bundle the 10 sticks with a rubber band. The game will continue for a while. Later

children will count how many bundles and how many loose sticks they have. Each child will write its number as number of bundles and number of loose sticks. Easily they will be able to make out who has more sticks and who has less.

- Children would form numbers making use of notes/beads/sticks etc by making groups of 10 and also some loose units.

Ask children to draw Ten's house and Unit's house. The children will write these numbers in the chart. Observe children carefully to find out if they have difficulties in counting, reading and writing the numbers.

Once children understand the concept, it is easy for them to write numbers. While writing numbers children have to do abstract thinking. They have to visualize the number of Tens and their place. The traditional method of saying 'one on one is eleven' is quite confusing. Instead teach them to say 'One ten and one is eleven' or 'A Ten and one is eleven' which is much clear to understand along with the place value.

**Teaching numbers from 11 to 99**

- Once they are fully conversant with counting up to ten, take a string of beads and count up to ten then place the finger on the next bead and say 'One Ten and one is eleven'. In this manner count up to twenty. Do not go ahead till they fully understand the numbers up to twenty.
- Place a string of 100 beads in front of the children and then start counting. 'One Ten and one is eleven, one Ten and two is twelve…, two Tens is twenty…, three Tens and four ones is thirty four…, upto 100 .
- Ask children to show any number on the string of beads. Ask them to place a number-card on the string at its right place.
- Tai should show a number-card and children would pick up notes of Rs 10 and Re 1 to show Tens and Units in that number.
- Tai should tell children, "One finger is one unit, we clap with ten fingers, so one clap is one Ten. I will show you numbers with claps and fingers, you have to tell me the number." After this without saying anything Tai will clap and show fingers. For example three claps and one finger. Children will guess the number as thirty one. Now reverse, Tai would tell a number and children would clap and show appropriate number of fingers.
- Tai can form two groups of children, Unit's group and Ten's group. Give each child in Unit's group a single bead and each child in Ten's group will get a string of ten beads. Write any number on the blackboard. As per the Tens and Units in the number those many children from both groups would come forward. For example, number 45, four children from Ten's group and five children from Unit's group will come forward. This activity will help the children to understand the meaning of 'place value'. They will also learn that four Tens is forty.
- After teaching a particular number, Tai should ask children to form five relevant sentences using that number. Like, for the number 22, children will tell- there are twenty two children in the class, let's make a necklace of 22 beads and so on.
- Tai would write a number on the blackboard and ask the children to read it. They will also tell the number of Tens and Units. Now Tai should interchange digits and once again ask the children to read the number and identify the Tens and Units. For example, 32 & 23 etc.
- Once they are taught numbers from 1 to 99, tell them any number and ask them to give notes/rods /units/ sticks indicating that number. Also ask children to show that number on the string of beads. For example, the number 30, if the child starts counting from 1 it indicates that he has not understood the concept of Ten's. If he has understood the concept of Ten's, he will give three notes of Rs 10 or three rods of Ten or three groups of ten sticks or he will show readily three groups of ten on the string of beads.

  The children will need time and a lot of practice to arrive at this stage. If it starts counting from one, do not stop him, it will gradually learn the concept of 'Ten'.

**Tight and Loose form of numbers**

After teaching numbers, the children should be taught the tight and loose form of numbers. We always write numbers in a tight form but many times we actually use them in loose form too. In Addition and Multiplication, the carried over number is in a tight form whereas in Subtraction and division, we convert the number from a tight form to the loose form. Hence, it is important to teach these forms while teaching numbers.

Discuss the tight and loose form of numbers with the children using notes of Rs 10 and Rs1. For example, number 23, in how many ways can they give Rs23, using notes of Rs 10 and Rs1. Draw two columns of Tens and Units on a slate as shown in the figure and ask them to place the notes on it.

**Tight form of a number**

| Tens | Units |
|---|---|
| 2 | 3 |

2 notes of Rs 10 and 3 notes of Re 1. A ten rupee note is a tight form of 10.

**Loose form of a number.**

| Tens | Units |
|---|---|
| **1** | **13** |

One note of Rs 10 and 13 notes of Re 1, here one Ten is in the loose form.

| Tens | Units |
|---|---|
| **0** | **23** |

23 notes of Re 1, here 2 Tens are in the loose form.

**Teaching the concept of 'Hundreds'**

Give the children 9 Tens, that is 9 rods of 'Ten' and show them 9 loose unit cubes. Ask them, 'If I add one more unit cube, then how many are there?'. Now tell them that the loose unit cubes are 10, so we can take 1 Tens rod instead. So now there are 10 rods of Tens which is Hundred.

100 unit cubes means 10 rod of Tens which means one plate of hundred. Show them that the slate of Hundred and 10 rods of 'Ten' are same.

While writing numbers, we write the number of loose units in the house of Units and the number of rods of Tens in the house of Tens. 10 rods of Tens make a hundred, so we write the number of hundreds in the house of Hundreds.

Understanding the concept of hundreds is one level higher of abstract thinking than the concept of Tens. For understanding numbers it is important to take many activities which involve forming numbers with currency notes, rods, cubes, beads etc. drawing columns for Hundreds, Tens , Units and writing the numbers in their correct places; recognizing numbers. These activities will help the children to understand the concept of 'numbers'.

| Hundreds | Tens | Units |
|---|---|---|
| **1** | **0** | **0** |

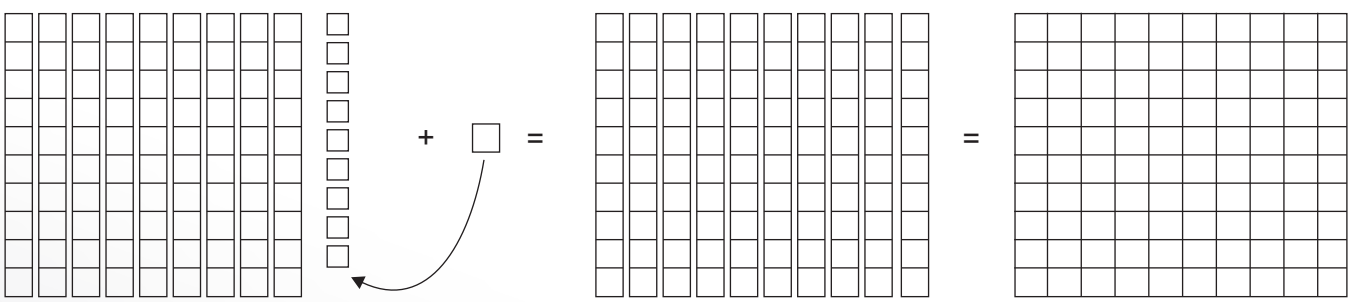
**Activities for understanding the concept of 'Hundred'**

- Recite with the children: One Hundred one, one Hundred two, … one Hundred ten. One Hundred ten is 110. In this manner, introduce further numbers also. Notes, beads, units, rod of tens are useful for understanding the concept of Place Value. Make use of pseudo currency notes for practice. Use only notes of Re 1, 10 and 100. Tai should tell any number and children should give the notes of that amount.. Also, Tai should give them some notes and children should identify the number. Practice also, numbers like 110, 120,….200.
- Make number-cards for the numbers 101 to 200. Shuffle them like playing cards and then distribute among the children. Ask them to arrange them sequentially. This will help them to understand, smaller and greater numbers.

**Activities for understanding the Order of numbers**

Children now know the numbers. Before introducing addition and subtraction it is important for them to understand the relation between numbers Smaller than - Great than – Equal to. Learning is always easier through games. Some activities which children like are given below.

- Ask the children to arrange the playing cards sequentially. Teach them the card game 'Heart 7 (The game is explained in detail on Page 298)
- Distribute at random the number–cards from 0 to 99 among the children and ask them to arrange these cards sequentially.
- Ask the children to sit in a circle, ask them to say the numbers from 1 to 99 in sequence and then in reverse sequence from 99 to 1.
- Tai should give each child 3 number–cards and ask them to arrange these cards in ascending and descending order.
- Tai should place the number–cards face down. Children should pick up any card and read the number. Also, ask them the numbers before and after the number they have picked up.




**9 T** **9 U** **+ 1 U =** **10 T** **=** **1 H**

## Concept of addition

Before teaching the children the technique of addition, they should understand the meaning of the word 'Addition'. Explain to the children that addition means "putting together, combining together, how many of them altogether". Give these instructions to children and ask them to do these activities with various objects or by drawing figures on the blackboard. Practice these activities with lots of examples. Once they fully understand this concept, then introduce addition in the form of just numbers. **Practice a lot with children, examples using various things, converting examples with things into numerical form and later the examples in numerical form to word problems.**

Teaching of numbers from 0 to 9 should be followed by addition and subtraction, orally, using things and using word problems.

For example, Geeta brought 2 and Neela brought 5 flowers from the garden, so how many flowers did they get altogether?

Now write this example on the blackboard.

| | | |
|---|---|---|
| | 2 | flowers by Geeta |
| + | 5 | flowers by Neela |
| Total | 7 | total flowers |

Introduce the symbol of addition'+' and explain this method of writing. While learning numbers from 1 to 9, the children have learnt that the next number is obtained by adding 1 to the previous number. Now they have to learn that combining any two numbers is the addition of these numbers. Children are already aware of addition from their experiences like total number of books, vessels, money etc.. They now have to learn the technique of writing and finding answers.

## Some activities for Addition

$4+1=5$; $1+4=5$; $2+3=5$;

$3+2=5$; $5+0=5$; $0+5=5$;

These additions can be shown with the fingers on both hands.

**Story of number 'Nine'**

$0+9=9$; $1+8=9$; $2+7=9$; $3+6=9$;

$4+5=9$; $5+4=9$; $6+3=9$; $7+2=9$;

$8+1=9$; $9+0=9$

- Using things - Like, show one leaf and ask how many. Now take one more and ask how many, in this manner proceed with addition orally up to nine.
- You can also use the currency notes for this activity.
- Give two dice to the children. They can throw them and count the total number of dots.
- Form two groups of children, call four children from one group and two from the other group. Ask the rest of the children to count them. Now write this addition on the blackboard.

  $4+2=6$.
- Ask children to sit in a circle. Ask them to keep their hands on their knees with palms open. One child will count his fingers and say 'ten', the next child should add his fingers to the first one and say 'twenty'. In this way you can go on adding the number of fingers.
- Give the children number-cards from one to nine. Ask them to arrange in a 3 x 3 square so that vertically, horizontally and diagonally the total is always fifteen. Children of grade 3 and 4 can do this activity.
- 'Addition Dominoes' is a very useful teaching aid. This is explained in the section of Dominoes on page 299.

**Teaching Addition using Pseudo currency notes**

Before using notes to solve problems, the children should understand that one rupee notes should be kept in the house of Units, 10 rupee notes in the house of Tens and those of 100 rupees in the house of Hundreds. Also explain to them the reason for this activity.

First practice keeping the notes in the correct houses for any given number. This will help teaching Addition.

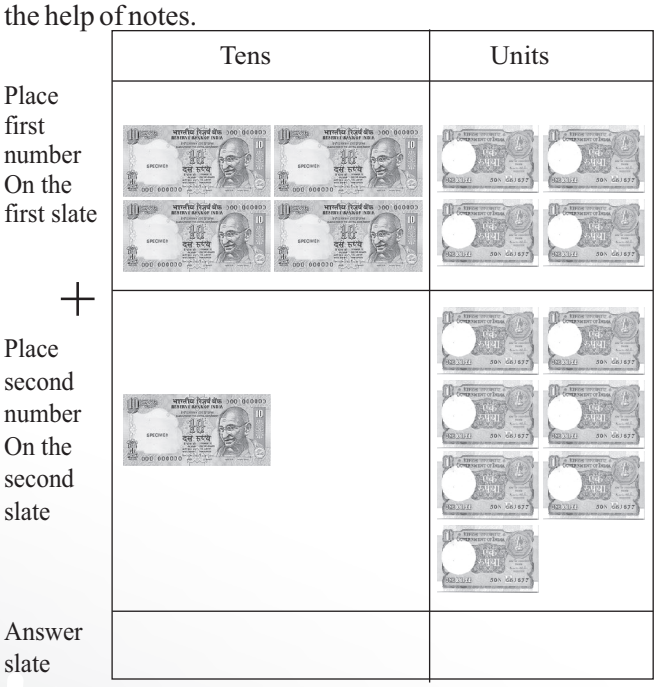
**Teaching Addition with 'carry over'**

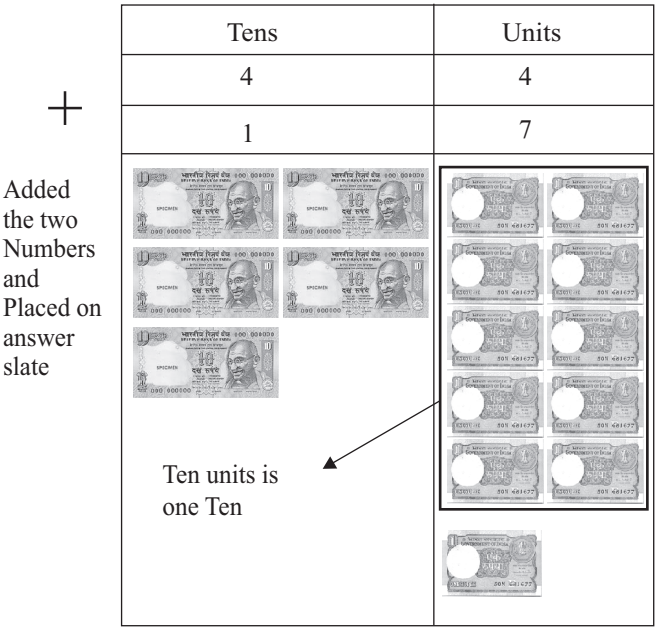
**Stage 1:– Understanding the concept with things language**

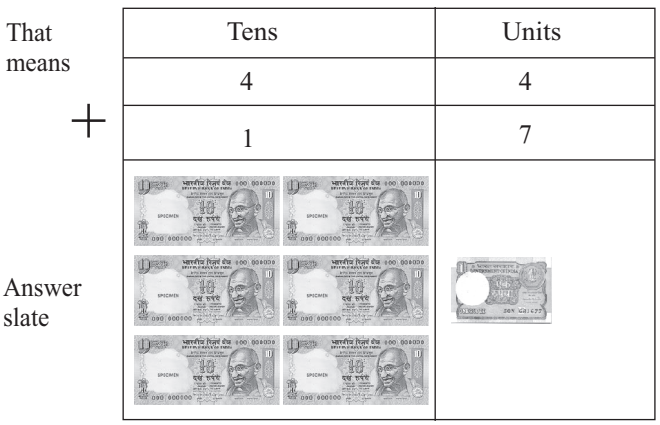
Place three slates one below the other. Draw a line in the centre to create the houses of Units and Tens. Using currency notes, place the two numbers to be added one on the first slate and the other on the second slate.

For example: 44 + 17

The figure below shows how to teach this addition with the help of notes.




**Stage 2:- Conversion into mathematical language**

| | Tens | Units | |
|---|---|---|---|
| Carry | 1 | | |
| + | 4 | 4 | First number |
| | 1 | 7 | Second number |
| | 1 | (1) 1 | Addition(answer) |
| | 6 | 1 | |

Instead of using notes, one bead and a string of 10 beads can be used. Also one stick and a bundle of 10 sticks can also be used.

Right from the beginning the children should be encouraged to solve and form word problems so that they are familiar with them. Once they can do this , Process of mathematical thinking is started

## Concept of Subtraction

For the children to learn subtraction, it is essential that they understand relation between numbers, smaller and greater.

Before actually teaching subtraction, instead of the word 'subtract', they should be familiar first with the terms like 'less by how much, more by how much, remove, after taking away some of the objects how many are left'. By practicing some activities involving above terms, children become familiar with these terms and then it is easy to connect them with actual subtraction.

Once they understand the concept of subtraction, introduce the sign of subtraction. Next write the orally solved problems on the blackboard. Use of currency notes helps them to grasp the concept thoroughly.

After teaching single digit numbers introduce them to addition and subtraction of single digit numbers and solve such problems.

Ask them to solve problems through actions. For example, seven children came to play but three of them went home. How many are left?

Seven children should come in front then; three of them should go back to their place. Now ask the class to count the remaining children.

- Take lots of practice to form oral word problems.
- Tai should give each child leaves/flowers/seeds/ pebbles/ sticks(less than 10). Tell them to keep things aside one by one and go on asking them how many things are remaining. Continue up to zero.

**Use the dice for subtraction.**

- Bring a twig of a tree with 8 to 9 leaves. Count the leaves with the children. Now remove the leaves one by one till there is nothing left i.e zero.

  Take two dice of different colours. There will be different numbers on each surface. Define the rules of the game. For example, subtract the number on the yellow dice from that on the blue dice. This means that the numbers written on the blue dice should be greater than those on the yellow dice. This game helps them to do subtraction orally. Encourage children to form word problems with the numbers on the dice, help them wherever necessary.
- Ask the children to do word problems among

### When do we subtract?

- **To find how many are remaining, for example**
  - I had 13 beads and I lost 5 of them, so now how many are remaining?
  - Vegetable seller bought 25 bunches of Fenugreek vegetable from the market of which she sold 17, so how many are left?
- **Compare and find the difference, for example**
  - I have 15 toffees and my friend has 20, then how many more than me does he have?
- **Finding how much work is done or how much is still remaining, for example,**
  - A book has 40 pages, if 13 pages are still to be read then how many did I actually read?
  - Cost of a dress is Rs 150. I have Rs 70 so how many more rupees do I need to buy the dress?

themselves using the currency notes. For example, "I had Rs 15. If I bought a pen for Rs 7 then how many rupees are left with me?" Please remember, Children should understand that the problems on Addition – Subtraction should be solved starting from the Units place.

- Write a problem on a slate. Place, on the slate as many bundles of 10 sticks as the number in the Tens house and place loose sticks in the Units place as per the number in the Units house. Next as per the second number written on the slate, remove the loose sticks first i.e. Units and then bundles i.e the Tens.

  Now count the remaining sticks and bundles to get the answer.

**Subtraction using Currency Notes**

While teaching subtraction, draw columns on the slate as shown in the figure given below.

For example: 326 – 214

In this example, for the number 326, place 3 notes of Rs 100 in the house of Hundred, 2 notes of Rs 10 in the house of Tens and 6 notes of Rs1 in the house of Units. In the next row write the number 214, it is not possible to keep notes here as we have to remove Rs. 214/- from existing notes for Rs. 326/- .

| | Hundreds | Tens | Units |
|---|---|---|---|
| |  |  |  |
| – | 2 | 1 | 4 |
| | | | |

While subtracting, remove 4 notes from the 6 notes of Rs 1, 1 note from the 2 notes of Rs10 and 2 notes from 3 notes of Rs100 and place the remaining notes in the Answer row. Children can count and write the answer as 112.

| | Hundreds | Tens | Units |
|---|---|---|---|
| | 3 | 2 | 6 |
| – | 2 | 1 | 4 |
| |  |  |  |
| | 1 | 1 | 2 |

**Subtraction with borrowing**

Many times, the children in higher grades also find it difficult to do subtraction with ''Borrowing'. Currency notes help them to understand the subtraction well. Once the concept is clear they will not need the help of any 'Aids'.

Gradually decrease the use of aids as they grasp the concept. They should be able to do subtraction by writing both numbers in the houses of Hundreds, Tens and Units.

**Step 1: Understanding the concept with the help of currency notes (thing language) .**

Place 3 slates one below the other as shown in the figure below. Draw columns of Tens and Units with a chalk. Place the number of notes from which we have to subtract on the first slate (example 35) and the number to be subtracted on the second slate (example 17).

| | | Tens | Units |
|---|---|---|---|
| Place first number On the first slate | |  |  |
| Place second number On the second slate | – | 1 | 7 |
| Answer slate | | | |

We have to remove the number on the second slate from that on the first slate.

But in this example, "Is it possible to take away seven

| | Tens | Units |
|---|---|---|
| |  |  |
| – | 1 | 7 |
| Answer slate | | |

rupees from 5 rupees? No, then what should we do?" ask the children.

Take one Rs 10 note and change it to 10 notes of Rs1 and place them in the house of Units. This means that we have to exchange one 10 rupee note from the Tens house and take 10 notes of rupee one and place them in the units house. . Now explain that there will be 15 notes in the house of Units. ( 10+5) Ask them to count the number of notes in the house of Tens. In this example there will be two notes in the house of Tens.

This means that Rs35 is now in the form of 2 notes of Rs 10 and 15 notes of Rs1.

From 15 notes in the house of Units, take away 7 notes. Remaining 8 notes should be kept on the answer slate. In the same way, when we take away 1 note from the house of Tens, there will be 1 note on the answer slate. So the answer is 18.

| | Tens | Units | |
|---|---|---|---|
| | 2 | 15 | |
| – | 1 | 7 | |
| 2 Tens – 1 Ten is 1 Ten. So one note In the house of Ten |  |  | 15 – 7 = 8 Rs 8 in the house of Units |

**Step 2: Converting to Mathematical form**

| | Tens | Units | |
|---|---|---|---|
| | 2 | 15 | |
| | ~~3~~ | ~~5~~ | First number |
| - | 1 | 7 | Second number |
| | 1 | 8 | Subtraction (answer) |

In this chapter, mathematical concepts, TLMs, activities are given separately for convenience, but actually they are all related to each other. For example, while teaching the concept of numbers, the operations on numbers can also be easily introduced. Playing with numbers in different ways helps them to understand the concept of numbers. For example, 'from 5 chalks give me 2, so how many are left?' is an introduction to subtraction. Hence when later they learn Subtraction, this practice helps them to understand the concept better. . Once they learn numbers through things, activities for adding, taking away, giving two to each one and then counting, distributing equally amongst the group. etc. These activities will be later useful while learning multiplication and division.

In this book, activities with TLMs like rods-, square note books, currency notes, dices, dominoes, cards, calendars are given. It is also explained how and where these TLMs are to be used. For convenience, detailed information of some of these TLMs is given in the last section.

## Understanding the mistakes made by the children

If you look sympathetically at the different kinds of mistakes made by the children, then it is an opportunity to understand the hurdles in their thinking and grasping. When and where the child makes mistakes, reflects the drawback in his thinking. Accordingly, explain to the child exactly where he is going wrong so that he will probably not make the same mistake again. While teaching Mathematics, it is important to realize that what is simple and easy for us may be actually very difficult for the child to grasp. On the other hand, it is difficult for the teacher to really know what the child has understood. Evaluation of the problems solved by the children should not be in the form of just 'Right or Wrong'. Sometimes the children may not have understood but yet arrived at the 'right answer' by chance. It is more important to understand what the child has understood rather than his mistakes. Let us see how to do this by some examples.

If a girl solves a problem in this manner, it is not correct to say that she has not followed subtraction. She has in fact understood the first basic rule that the smaller number should be subtracted from the greater one. She has not applied this 'rule' to the whole number but only to one digit. in each house. She has understood one digit subtraction. She has to be taught difference between the digits and whole number, 2 digit and 3 digit numbers and their comparison -smaller and greater numbers, place value, concept of carry over etc. . When she understands all these concepts together then she will be able to do subtraction correctly.

| | |
|---|---|
| 21 | 428 |
| - 16 | - 399 |
| 15 | 171 |

**Example 2:** Write in ascending order. 222, 187, 121. Answer: 121, 222, 187

May be, this girl knows only up to two digit numbers. So she must have arranged these numbers according to the last two digits, so she needs to be taught three digit numbers. It is also possible that she knows three digit numbers but is not sure about the meaning of ''ascending order''. In that case, explain that 'first write the smallest number, then greater than that and proceed till the greatest number, this is called ascending order.'

**Example 3 :** Write the correct number in the box.

In this example, the children have understood the concept of addition but all the same let us see their mistakes.

11 + 6 = ☐ + 10

Children from primary school may not immediately give the answer as '7'. May be they will give one of the different answers given below.

Answer 1) 11 + 6 = 17 + 10

Here the child knows addition but is confused about the equality sign ' ='. The child thinks that the answer to the addition should be written after the '=' sign. It has not taken into consideration '+10'.

Answer 2) 11 + 6 = 27 + 10

Here the child has considered all the numbers, but he has not understood the position of '=' and the difference it makes to the answer according to its position. So he has written the sum of all three numbers in the box.

Children should be allowed to make mistakes, think independently and express themselves in their own words. Do not rush to the 'Right answer'.

**It is more important that they understand the concept and think logically rather than the 'Right answer'.**

If the teacher understands the logic behind the mistakes of the child then he/she will be able to help them in a right way.

# From Division to Fraction

| Columns in the table: | Number of equal parts of one whole. | Number of coloured parts. | Write the coloured part as a fraction. |
|---|---|---|---|
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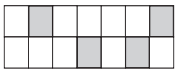
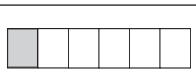
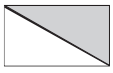
|  | | | |
|  | | | |
|  | | | |
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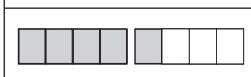
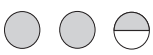
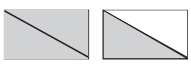
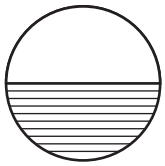
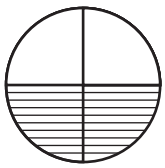
|  | | | |
|  | | | |
|  | | | |

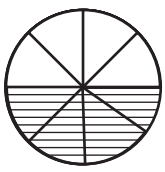
## Equivalent Fractions



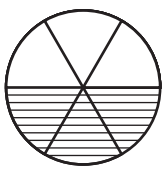
$\frac{1}{2}$ One circle has been divided in 2 equal parts and one part is coloured.



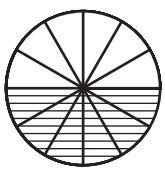
$\frac{2}{4}$ One circle has been divided in 4 equal parts and 2 parts are coloured.



$\frac{4}{8}$ One circle has been divided in 8 equal parts and 4 parts are coloured.



$\frac{3}{6}$ One circle has been divided in 6 equal parts and 3 parts are coloured.



$\frac{6}{12}$ One circle has been divided in 12 equal parts and 6 parts are coloured.

## Equivalent Fractions

**Those fractions which have different numerators and denominators but have the same value are said to be Equivalent Fractions.**

In many mathematical operations it is necessary to write a fraction in a different form without changing its value. So it is important to understand the concept of equivalent fractions through activities.

In the class, give the children paper circles, rectangles or squares. Ask them to colour the parts as given below.

In the given figure, the circles are divided into different number of parts but only half the circle is coloured in each figure. This means the value of the coloured part in each circle is $\frac{1}{2}$ . So they are all equivalent fractions.

In Figure 2, 2 parts of $\frac{1}{4}$ are taken together.

$\left(\frac{1}{4}+\frac{1}{4}\right) = \frac{2}{4}$ $\quad\therefore \frac{2}{4} = \frac{1}{2}$

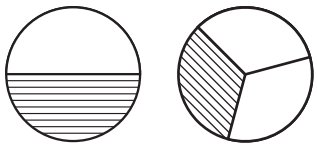
Similarly, $\therefore \frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{3}{6} = \frac{6}{12}$

With the help of this activity, encourage the students to observe and find the rule that if the numerator and denominator are multiplied or divided by the same number then we get equivalent fractions.

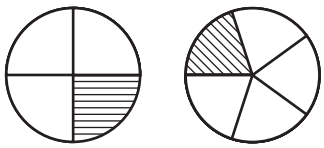
**Comparison of Fractions**

Give the following example for comparison of fractions.

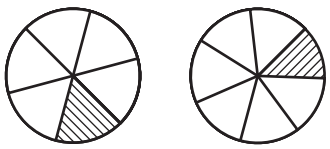
I have some rotis which are all of the same size. Each one will get the coloured part of the roti.



$\frac{1}{2}$ for Lata $\frac{1}{3}$ for Raj



$\frac{1}{4}$ for Gauri $\frac{1}{5}$ for Manju



$\frac{1}{6}$ for Kiran $\frac{1}{7}$ for Atul

Who got the largest part of the roti?

Who got the smallest part of the roti?

Atul got $\frac{1}{7}$ roti and

Manju got $\frac{1}{5}$ roti.

Write the correct sign (>, <) in the box below.

$\frac{1}{7}$ ☐ $\frac{1}{5}$

Ask the children to solve such examples with the help of figures.

From these examples they understand that if the numerator is 1 then as the denominator increases the fraction becomes smaller. This means that if the numerator remains same then as the denominator increases the fraction becomes smaller.

**Comparing fractions with equal denominators.**

Study the following example.

I have a rectangular cake. If I give Atul $\frac{1}{6}$ of the cake, Kiran $\frac{2}{6}$ of the cake, Lata $\frac{3}{6}$ of the cake, Manju $\frac{4}{6}$ of the cake, Gauri $\frac{5}{6}$ of the cake and Raj $\frac{6}{6}$ of the cake, then

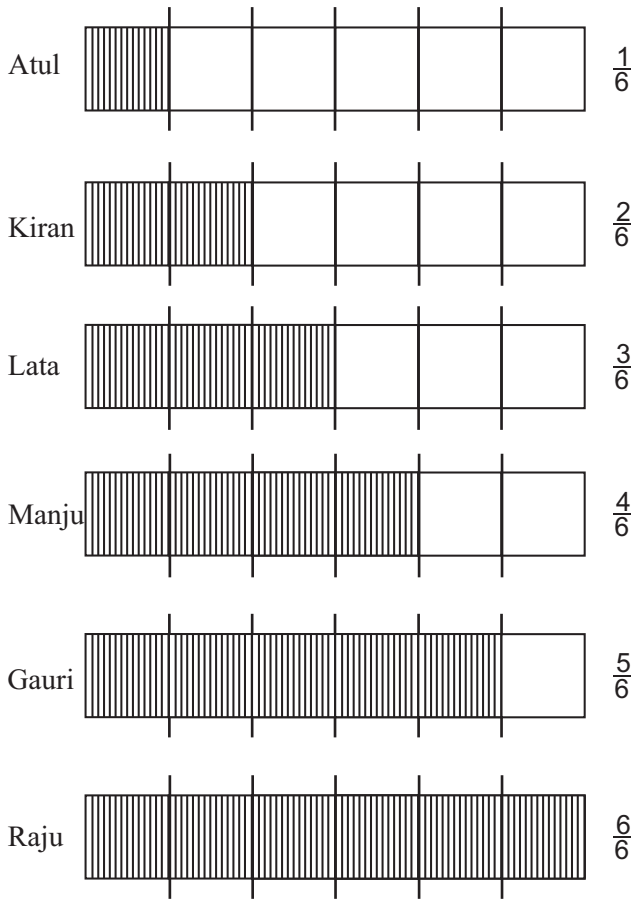
Who gets the largest piece?

Who gets the smallest piece?

Who got the bigger piece, Kiran or Lata?

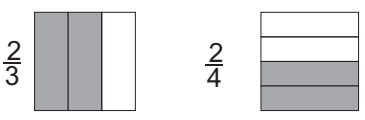
Many such questions can be asked. Ask the children to answer the questions with the help of the given figure. The piece of cake each child gets is shown by the coloured part.

From the above activity we understand that if the denominators are same, it is possible to determine smaller and greater fraction by comparing the numerator. This means that if the denominator is same then the fraction with greater numerator is greater.



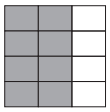
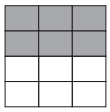

If both numerator and denominator are different then we need to make the denominators same to determine the smaller and greater fraction.

For example, Comparing $\frac{2}{3}$ and $\frac{2}{4}$, here the denominators are different.




For equalizing the denominators of $\frac{2}{3}$ and $\frac{2}{4}$, we have to change both denominators as 12.

As per the rule of Equivalent fraction, we have to multiply the numerator also by the same number as the denominator.

$\frac{8}{12}$  $\frac{6}{12}$ 

$\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$ $\frac{2}{4} \times \frac{3}{3} = \frac{6}{12}$

Once the denominators are same, the numerators can be compared to find the smaller and bigger number.

$\frac{8}{12} > \frac{6}{12}$

$\therefore \frac{2}{3} > \frac{2}{4}$

### Number line, an aid to teach Fractions

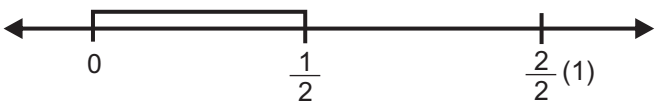
The number line extends on both sides to infinity. On this line, numbers to the right side of zero are positive and those on the left are negative.

Numbers between 0 and 1 which are greater than zero and less than one ( $\frac{1}{4}, \frac{1}{2}$ etc) are proper fractions. Improper fractions can be shown between any two whole numbers greater than one. These improper fractions are between the given whole number and the next consecutive whole number.

For example: $1\frac{1}{2}$ , $1\frac{3}{4}$ are between the numbers 1 and 2.

Four number lines are given below to understand the meaning of fractions and the 'smaller than' – 'greater than' relation between the fractions.

**1 by 2**



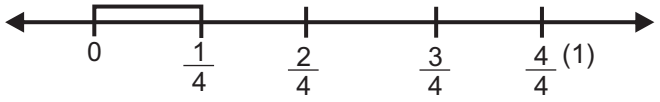

$\frac{1}{2}$ is one part of the two equal parts from zero to one.

**1 by 3**

$\frac{1}{3}$ is one part of the three equal parts from zero to one.


**1 by 4**

$\frac{1}{4}$ is one part of the four equal parts from zero to one.

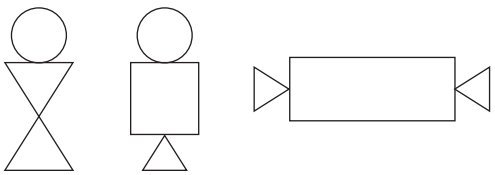



Number line can be used to teach improper fractions and equivalent fractions.

## Knowledge of Shapes – Basic and Natural Shapes.

Children can see circles and squares around them, so they understand them easily whereas triangles are not commonly seen. Let the children collect different objects of these shapes and play with them.

Give the children these shapes and ask them to make different arrangements as shown below.



Next ask the children to look for different objects of these shapes around them.

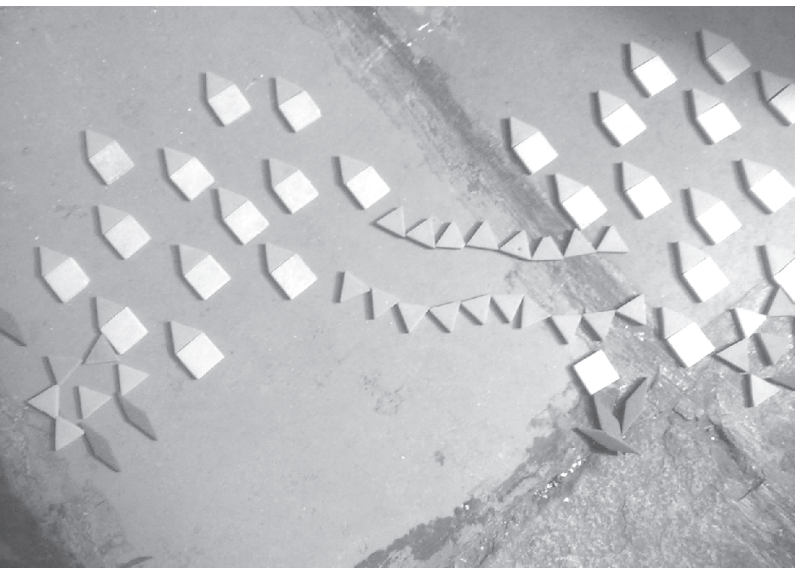
Let them also classify them according to their shapes.

Everyone has to use geometric shapes and geometry in daily life in various transactions. It may be used while buying or selling land, stitching clothes, calculating number of chairs that can be placed in a hall and so on. Hence it is important that children clearly understand shapes at an early stage.

### Activities to understand shapes

- Ask the children to identify shapes on their body. They can easily find point, line, circles and enjoy this activity. Next ask them to make shapes using their hands, legs and fingers.

  Children bend backwards, use hands to form a semi-circle. Next ask 2, 3 or 4 children to form different shapes together. Through such activities they learn the basic geometrical shapes like line, circle, semi-circle, triangle and square.
- Tai should cut out triangles, circles and squares of different sizes from a cardboard. Place three large boxes in front of them with a sticker of the shape on each of them. Ask them to classify the triangles, circles and squares and place them in proper box. This helps them to understand and remember various shapes.



**Arrangements using triangles and squares made by the children**

- Give children cut outs of different sizes of the same shape and ask them to make different designs using them. This will help them to identify various shapes around them.
- Ask children to make different shapes using match sticks. Help them if needed.
- Give the children some pieces of rope. They should draw different shapes on a card board and stick the rope on the borders of every shape.
- Make cards from card sheets. Paint triangles, circles, squares and rectangles on those cards. There should be at least 10 cards of each shape.

  The rule for playing these cards is that while playing, if one person plays a card and the next one plays the same shape, he gets both the cards. Tai should explain this rule. Children enjoy playing this game of cards.

## Learning Geometrical shapes using Dotted paper

While teaching geometry to the children in Primary school, the 'Dotted paper' is a very useful TLM.

Place a blank tracing paper on a graph paper and plot the dots. Now make one 'Dotted paper' using this tracing paper. Next make lots of copies of these Dotted paper. For the children of grade 1 and 2, the spacing between the dots should be 2 cm. For higher grades it should be of 1 cm.

Children love to draw pictures by joining the dots. They also know simple designs of 'Rangavali'. So all the children are able to use dotted papers and make pictures.

Except for circle, all the geometrical shapes are made up of straight lines. So the Dotted paper is an effective aid for the primary grades.

- Instead of using the word 'point', call it a dot and ask the children to draw vertical, horizontal and slanting lines by joining the dots. ( Initially the lines may not be straight)
- Circle two dots on the paper, now ask the children to draw lines passing through both the dots. Ask how many lines they can draw. However much they try, they can draw only one line joining the two dots.

## Angles

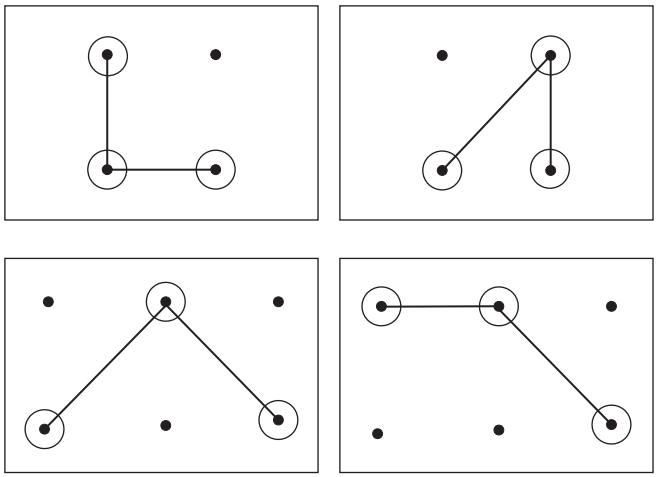
- Ask the children to circle three dots which are not in a straight line on the dotted paper. Ask them,

  "How many lines can be drawn from one of the three dots to join the other two dots?" The figure that is formed is an 'Angle'. Tell them to join different points and form different angles. One vertical line and one horizontal line drawn from one single dot will look like a right angle. Explain the concept of right angle using a protractor and drawing an angle of measure 900. You can now teach them that an angle smaller than 900 is an 'Acute' angle, whereas angle greater than 900 is an 'Obtuse' angle. Now ask them to look around for these acute and obtuse angles.

  Many a times children are confused if the angle is drawn in a different direction. So, instead of the standard form, draw the angles in different directions, also upside down.
- Tai should straighten a U-pin and then make an angle by bending the two ends. Ask the approximate measure of this angle. Now place two straws along the sides (arms) of an angle. Next cut them at the two ends and ask the children whether the measure of the angle changes. Also discuss that by increasing or decreasing the length of the straws, the angle remains the same. This activity will teach them that the measure of the angle does not depend on the length of the two sides of an angle.

After this activity, teach them the concept of acute, obtuse and right angle and let them practice using straws .

- Ask children to look for angles inside and outside the classroom. For example, angle between two walls, angles in our body like angle between fingers, elbow, knee etc. Angle made by the sloping roof etc. Children will also find angles in the spokes of Tai's umbrella, legs of the chair, water pipes and so on.
  In this manner it is important for the children to have a clear image of the acute, obtuse and right angle in their minds. After this teach them how to measure angles.
- Introduce quadrilaterals to them. Draw various quadrilaterals in different ways and also ask them to draw. Explain the difference between a square and a quadrilateral.
- Children will easily understand the difference between a square and a rectangle with the help of the Dotted paper.



- It is possible to teach quadrilaterals like parallelogram, rhombus and pentagon, hexagon with the help of the dotted paper to children of grade five and above.
- Children can draw various patterns on the dotted paper. This helps in their creativity as well as clears their concept of shapes.

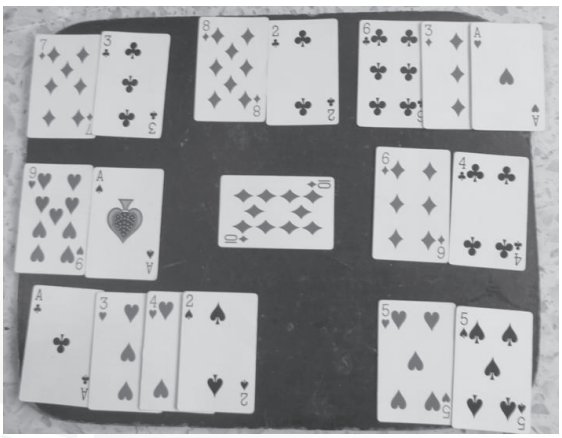
**Children making designs from shapes**

# Mathematical TLMs

When we learn Mathematical concepts and operations with the help of TLMs. it is easier to understand the mathematical language. These TLMs make teaching simpler for the teachers. For example, to teach numbers, we can use small sticks. Making bundles of ten sticks and some loose sticks are very useful to teach the concept of Tens and Units. Games like 'forming a group of sticks indicating the given number' and 'recognizing a number from the given number of sticks' can be played. This also helps in understanding 'place value' of the numbers. Take two bundles of sticks, count the sticks in each bundle, now put them together and again count, this teaches them the concept of addition. Multiplication can be taught by making bundles of equal number of sticks. Also making equal parts of the given number of sticks teaches them Division. Comparing the length of two sticks teaches them the concept of smaller and greater. The same sticks when joined together in different ways gives shapes like triangle, square etc. While teaching in this manner we start thinking of more and more innovative ways to use them. This also leads to making the teaching of Mathematics simpler by using many other objects. Khelghar has many such aids, some activities with these aids are given here. You can use them and add a few more by using your imagination and creativity. These aids can be used right from the first step of 'number recognition'. With the help of teaching learning aids understanding concepts becomes easier and joyful.

## Card Games

The ' playing cards' help in logical thinking which is necessary for learning Mathematics. These cards are very helpful as an aid to develop abilities, starting right from classification, numbers, ascending – descending order, mental addition, estimation etc. In many households of the middle class families, cards are played by everyone for entertainment, but in the 'basti' cards are mainly used for gambling. So playing cards is treated as a bad habit. In such cases, it is necessary to remove this stigma from the minds of the parents and the students. You have to teach them the habit of solving simple mathematical problems while playing and enjoying. This habit has to be inculcated with special and conscious efforts by the teacher. Tai has to explain the rules of each game precisely and also be watchful whether the objective of the game is achieved, if not, then ask pertinent questions to get the expected results. Tai has to keep a watch, help and guide whenever needed. As an example, one such game has been explained in detail.



## Seven of Hearts

Players: More than two children

Remove the 'jokers' from the set of playing cards and then distribute the 52 cards to the players. The player who has the seven of hearts should start the game by placing it in the centre of the circle. Next each player will place their cards one by one. On one side of the seven will be the eight, nine, ten, jack, queen and the king of hearts. On the other side of seven will be the six, five, four, three, two and ace of hearts. Now if someone doesn't have any card of hearts to play but has the seven of another suite then he should place that seven in the middle. Now similar to hearts, place the cards of that suite on either side of seven. If a player does not have any suitable card to play he will say 'Pass' and miss his turn. The one who finishes all his cards first, wins the game.

When one player wins, then the rest of them have some cards remaining with them. Now add the value of the remaining cards with each player. Ace to ten has value from 1 to 10. Jack is 11, queen is 12 and the king has value 13. Add the values of the cards with each player, these marks should be given to the winner.

**Benefits**

- Useful to learn the order of numbers up to ten, revision of ascending and descending order.
- Logical thinking is developed. For example, if a player has a six and an ace of hearts, he must play the six so that he can later play the ace. It is necessary to play the six early otherwise he will not be able to play his ace in time.

- 'If I have only a six or eight of any suite, I will play it last so that the other players are stuck with their cards whereas I can finish early.' This logical thinking is developed to win the game, at the same time values like following the rules of the game and not cheating are also developed.

In this way, other card games can also be played. Each game will develop some skill. Games of cards like 'addition zabbu', '5-3-2', 'ladies' etc. will teach the children to think logically.

## Dominoes – A TLM to master the concepts

Children love to solve puzzles. Dominoes is a game of many puzzles or a chain of question-answers. Its format is to take any one concept, then form a chain of question and answers with reference to that concept. This game can be made simple or difficult as required. It can be played with one or many children.

In this game we use some long strips, each is divided in two parts. On the first strip, in the first half 'Start' is written and the second half has a question. In the next strip, the first half is the answer to the first question and second half has another question. This process continues till we reach the last strip on which is written 'End'. In this game, we can make any number of cards. The game of Dominoes may be in reference to any concept. It can be on any subject like a language, mathematics, science, history, geography etc. It is fun to create dominoes. Once the children learn to use them, they can also create some. They enjoy the process of creation.

The example given below will explain clearly about Dominoes. Below is given a chain of Dominoes as an example. This Domino is based on addition of one digit numbers and adding zero.

Shuffle and distribute the strips of Dominoes to the children like in playing cards. The child who gets a strip with 'start' written on it should play first and place it in the middle. Now everyone should read the question on it and check whether they have an answer to it, if so he should place his strip after the first one. For example, here the question is '5 + 3', so the one who has the answer '8' will place his strip, now next question is '6 + 0'. In this manner everyone should place their strips and complete the game. If anyone makes a mistake, others will explain it to him.

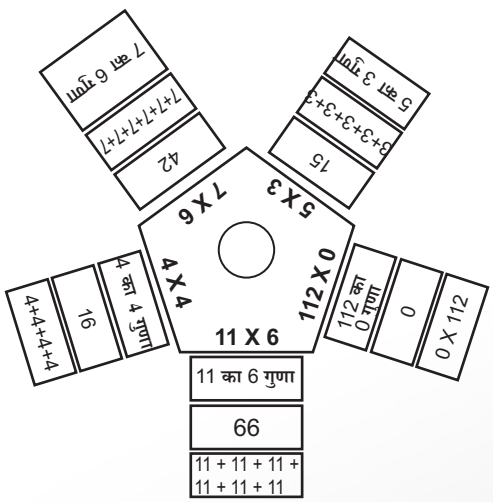
Dominoes are useful to learn mixed operations, fractions, geometric concepts and many more. Many children can participate in this game of chain Dominoes, but for that large number of strips have to be made. Initially start with simple ones and then proceed to more difficult ones. This helps them to thoroughly understand many concepts.

Dominoes can also be used for pairing. They can be used in many different innovative ways. The next given figure is that of a 'Multiplication Domino'. Here the central card is in the shape of a pentagon and on its each side, a multiplication problem is given. Cards with the solution of these problems in different ways are given to the children. Shuffle and distribute them among the children. They should place their cards in the correct position. Make different dominoes creatively and note that they can be used effectively in all subjects.

**Addition Dominoes]**

| | |
|---|---|
| Start | 5 + 3 |
| 8 | 6 + 0 |
| 6 | 2 + 3 |
| 5 | 5 + 4 |
| 9 | 5 + 5 |
| 10 | आखिर |

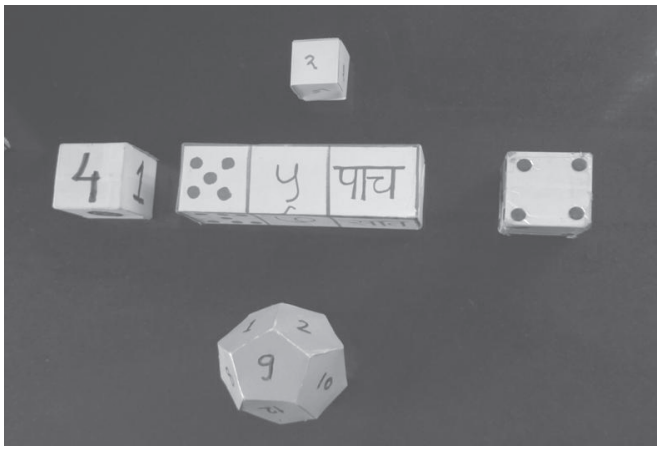
**गुणा का डोमिनो**



# Dice

The dice that we use in the well-known game of 'snake and ladder' can be used in different ways to teach Mathematics. A carpenter can make dice as per your requirements of different sizes and shapes. We can also use the cardboard cartons of toothpaste and CFL lamps to make dice of various shapes. The thick sheet of an invitation card can also be used to make dice. The method of making dice is readily available on You Tube.

Once you decide the application of the dice, you can paint dots on it or paste some round ' bindis' or write numbers




on it. Dice with signs of mathematical operations can also be made. Children find it easier to play with large dice, they also enjoy the play. After throwing the dice a 'number' appears suddenly. This surprise is the speciality of the game. Generally, a dice has dots from 1 to 6, but one can write any numbers on it.

## Mathematical games played with the Dice

When you want to practice only one operation, then make a die for it. For example, Addition or Multiplication dice.

• While teaching addition, take two dice with numbers and one with the '+' sign. Encourage the children to add mentally. For example, if the numbers on the two dice is 6 and 3 and then children will add the numbers and give the answer on the third die. This can be repeated, so that the children will throw the dice and add the numbers on its face.

(Subtraction with the help of dice is given on page 281)

| 6 | + | 3 |
|---|---|---|

* The game can also be played in a different way

Arrange the dice as shown below. Now ask the children to put the die of the correct sign between these numbers.

| 4 | | 2 | = | 2 |
|---|---|---|---|---|

Many different problems can be solved in this way as per the children's need.

- Take two dice of different colours; call one of them as a die of 'Tens' and the other of 'Units'. Now throw the dice, ask the children to read the number. Also give them a number and ask them to show it with the help of the die.
- Ask the children to throw two dice with numbers on it and a third die with signs of mathematical operations. For example, the numbers on the two number dice are 4 and 2. Now if the third die shows '+' sign, the children will answer 6 but if it's a multiplication sign, the answer is 8. This game can be used for addition and multiplication. For subtraction, it is essential to tell them to subtract the smaller number from the greater number.

## Square grid notebooks – Suitable for multiple activities

### Activity based TLM

This aid is very simple and cheap. Children get engrossed in this activity and they will develop new games on their own. In this article the use of square grid note books, right from number recognition to operations in various stages are given below.

- **Some games for thorough understanding of numbers one to nine**

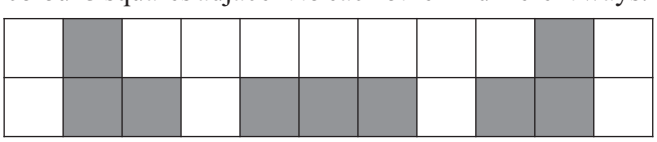
**Colouring squares**

Children will colour the squares in the notebook as per the given number.

For example, if number 3 is given, they will colour 3 squares

- **Numbers and making shapes using those many adjacent squares**

For example shapes for number 3. Ask the children to colour 3 squares adjacent to each other in different ways.

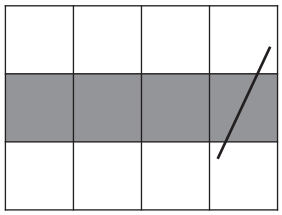


- **Addition of one digit numbers**

3 + 2 = 5

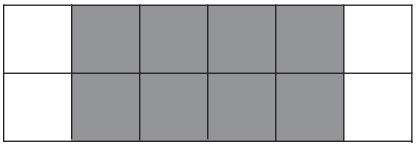
3 + 5 = 8

- **Subtraction of one digit numbers**



4 – 1 = 3

- **Multiplication of one digit numbers**



4 x 2 = 8

This means that four squares coloured two times is eight squares.

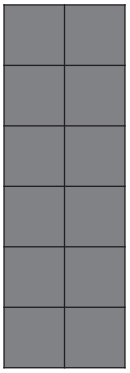
## Factorisation

Factorising 12, means colouring twelve squares consecutively in different ways.

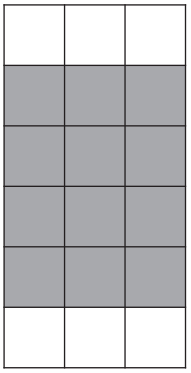
We can colour 12 squares in a column vertically or 12 squares in a row horizontally. Also, we can form a group of two squares and then colour 6 such groups or form a group of 3 and colour 4 such groups. These are shown in the figure given below.

12 x 1 = 12

1 x 12 = 12



2 x 6 = 12

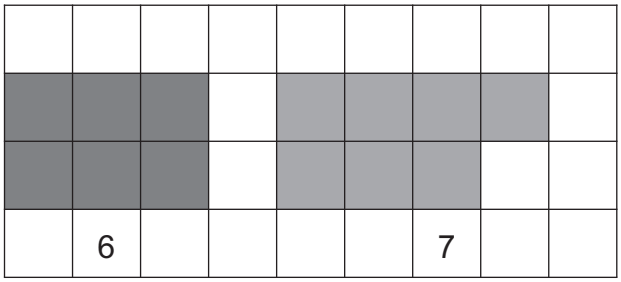


3 x 4 = 12

## Even and Odd numbers

Tai will give a number, then children would form groups of two and colour these groups according to the given number. If it forms a rectangle, the number is Even and if one square remains outside, it is an Odd number.

As shown in the figure given below, number 6, forms a rectangle so it is even, whereas 7 is an odd number.



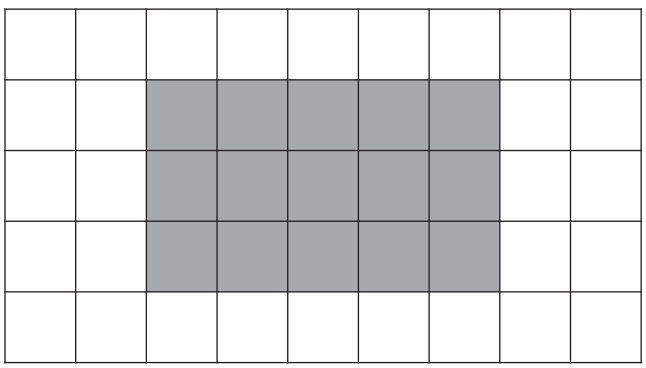

## Area of a Rectangle/Square

The space enclosed by a closed figure is called its area. In the square grid notebooks, it is actually possible to see and measure the area. Hence these note books are very useful for the understanding of the concept of area.

Area of a rectangle = length of rectangle X breadth of rectangle

If the length is 5 cm and breadth is 3cm, then

Area = length X breadth =
= 5cm X 3 cm
= 15 sq. cm



Ask the children to colour 5 squares in a row and next to it 3 rows vertically to form a rectangle. Ask them to count the total number of squares which will be the area of the rectangle.

Here each small square has an area of 1 sq.cm, so the rectangle made of 15 small squares will have an area = 15 sq.cm

## Area of a square

One small square has an area of 1 sq. cm.

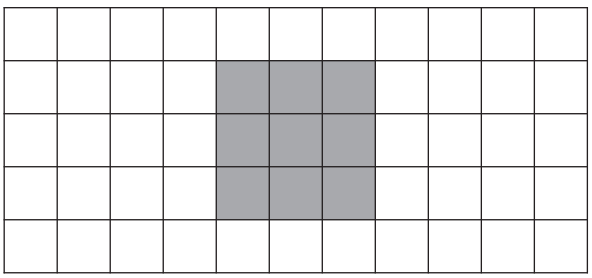
Length of the side of a square = 3 cm

Area of a square = (side)2

∴ Area of square = 3 x 3 = 32 = 9 sq. cm

A three by three square has area = 32 = 9 sq. cm

In this way, we can find the area of any square.



# Games and activities with Number-cards

We can make number-cards from any thick paper. If some cards are lost or torn, we can easily make new ones to replace them. We can play different games with the children using the number-cards as per their age group, knowledge of numbers and their abilities. These games are very useful for thorough understanding of numbers. Some games are given below and you can also form different games.

As per the age group of the children and their knowledge of numbers, cards can be made from 0 to 10, 20, ……, 100.

## Activity with a single child

As per the age of the child, place cards from 0 to 10, 1 to 20 or 1 to 100 in front of him/her and do the following activities.

- Count the number of given objects and accordingly select the number card.
- Give number of objects as per the number on the card or do activities like clapping or jumping
- Pick up any card and read the number
- Give a number orally and ask the child to look for the card
- Ask the child to tell the Tens and Units of the number on the card
- Ask the child to pick up any card and tell the number before and after it or show it on a string of beads
- Ask the child to pick up two cards and identify the smaller and greater number
- Ask the child to arrange the numbers on the given cards in the ascending/descending order
- Ask the child to make the smallest and the greatest possible number using the digit on the given cards
- Ask the child to pick up cards with a specific digit in the Tens place. For example pick up all the cards with '4' in the Tens place.
- Ask the child to pick up card with a specific number in the Unit's place. For example pick up all the cards with '6' in the Unit's place.
- Ask the child to pick up cards as per the place value of the given number. (For example, given number is '45', so pick up card of 40 and 5)

## Activities for a group of 6 – 7 children

Ask the children to sit in a circle. Put a set of cards from 0 to 9.

- Each one in the group should pick up one card from this set. All of them together should form the smallest and the greatest number.

Put the cards from numbers 0 to 100 in the centre and do the following activities.

- Pick up the card whose sum is 100
- Select cards of prime numbers from 1 to 100

Now place cards of numbers from the tables of 2 to 10 in the centre.

- Ask each child to pick up the cards for one multiplication table.

Next place cards of numbers from 1 to 100 in the centre.

- Ask each child to pick up cards for one multiplication table. In the earlier activity, it was possible to complete the table but now it was not possible. Discuss the reason why this could not be done.

Make about 50 – 60 cards of random numbers from 0 to 1 lakh and place them in the centre.

- All of the children together should arrange the numbers in ascending / descending order.

Make many cards of random numbers from 0 to 1,000.

- Find numbers divisible by 2, 3, 4, 5, 6 and 9.

## Activity based programs related to mathematics

Once the children are taught Mathematical skills, concepts and techniques, it is necessary to make sure they have understood and are able to use them. So some activity based programs are given here. These programs will develop their friendship with mathematics, and its applications in daily transactions as well as their language skills.

## Learning measurement

We need to measure different things in our daily life. Children unknowingly measure them. These experiences will help them to learn measurements easily. Measurement is an important aspect of mathematics but its knowledge will also help them in their daily life to prevent them from being cheated by others. Also, measurement is a basic necessity in any vocational course. In Khelghar, many different activity programs related with measurement are conducted.

### Some topics and activities related to measurement

- **Estimation**

We use estimation in various ways in our life, like how much chilly-salt to use in cooking, the time required to travel from one place to another. We keep checking our guesses and accordingly plan the next step to be taken.

In Khelghar, even children in lower grades are encouraged to make a judgement or estimate. Some such activities are given here.

- Everyone should measure each other's height with hand span and then with a measuring tape.
- Give the children a slate and a jug full of water to hold in their hands. Now ask them to guess which object is light/heavy.
- Give the children pencils of different lengths, ask them to find long and short and then arrange them according to their lengths.
- Ask them to measure things with some measures used in daily life. For example, hand span, fist, step, glass, jug, pot etc. Note that everyone's measure will be different. Suppose we take 5 glasses of 'sherbet', it may be very sweet with someone's two fistful of sugar or may be bland by someone else's fist. While measuring the length up to the wall, one may measure it as 15 steps whereas another may take 20 steps. Now ask them to measure the same wall with a measuring tape. Show them that the measure will be the same for everyone. This leads to the need of the concept of standardised measures.(See practice sheet 1 – in this there is stress on measuring first with the hand span and then with a measuring tape)
- All over the world, the unit to measure length, weight and liquid is standardised. For example, Length is measured in – metre/centimetre, feet/inch. Weight is measured in gram/kilogram, liquids in litre/millilitre and time in hours/minutes/seconds. These measures are used all over the world, so they are called as 'standard measures'. The need for these standard measures can be explained by actually measuring with a ruler, measuring tape, weighing scale, measuring cylinder. Once they understand this concept, ask them to measure the length, breadth and height of a compass box, notebook and a square box. Also ask them to calculate the surface area of these objects and to find their weight. Ask them to estimate the volume of water and milk first and then to measure it with a measuring cylinder and verify the same.

Measuring cylinders with markings are available in the market or you can use empty cold-drink bottles or empty water bottles. These can be used to measure liquids.

- **Need of different, small and big measures**

Give the children some picture-cards and some cards with measures on them. Ask the children to pair the picture with its measure. So the children will pair sugar and kilogram, water and litre. After this, discuss with them the need for different measures and which measure is suitable for measuring a particular thing. Give the children various objects and ask them 'which measure is to be used for each one of them?'

Now discuss with them about the measure to be used for measuring length of one rice granule, length of a stick, distance between Khelghar and their home. A liquid medicine bottle comes with a small plastic measure in millilitre, show them this measure and ask questions

about it. Discuss with them small to big measures, like millimetre to kilometre, milligram to kilogram, millilitre to litre. These concepts will be clear once they solve practice sheets on this topic.

(Practice sheet 1 to 5)

While teaching all these measures introduce them to instruments like a ruler, measuring tape, spring balance, weighing scale, weighing balance, measuring glass. Ask them to observe them, read the numbers on it, their meaning, how to measure with it and how to take readings. For example, a ruler has markings of centimetre on one side and inches on the other side. Between any two centimetre marks there are ten lines of millimetre. So with the help of this ruler we can measure from minimum 1 millimetre to maximum 30 centimetres or one foot which is 12 inches. In this way tell them about all the different available instruments. Children should use various measuring instruments and measure different things on their own.

## Practice Sheet 1

### Age group: Grade 4 and 5

| | What to measure? | Length |
|---|---|---|
| 1 | Measure of your hand span | cm |
| 2 | Length of table ( in hand span) | hand span |
| 3 | Length of table | cm |
| 4 | Length of window( in hand span) | hand span |
| 5 | Length of window | cm |
| 6 | Length of blackboard(in hand span) | hand span |
| 7 | Length of blackboard | cm |

## Practice Sheet 2

### Age group: Grade 4 and 5

| | Units of measurement | Measure |
|---|---|---|
| 1 | Amount of water in a glass | Litre |
| 2 | Amount of water in a bucket | Glasses |
| 3 | Amount of water in a bucket | Litre |
| 4 | How many glasses of water in a jug? | Glasses |
| 5 | Amount of water in the jug | litre |
| 6 | How many buckets of water in a drum? | Buckets |
| 7 | Amount of water in a drum | litre |

## Measurement

Practice the following with children so that they will understand small and big measures and different instruments of measurement. Show the children a measuring tape and a one metre ruler, talk to them about who uses these measures and where they are used. Ask them to observe and read what is written on them and then give them the next practice sheet. It is necessary that Tai has done all these activities before asking children to do it. You can add a few more examples of day to day experience to the list. Note that the metre ruler should have only 1 metre mark on it and no centimetre marks.

## Practice sheet 3

Note : Do not use the side of the measuring tape /ruler with 'inches'

1. Measure the length of 'Dupatta' with given metre ruler.---------- metre.

Could you measure it accurately?----------.

2. Now measure the metre ruler with the measuring tape
3. What relation do you find between 1 metre and centimetres? How?

---------- centimetre = 1 metre

4. Now measure the length of Dupatta with a measuring tape.

Length of the Dupatta = -------centimetre = -------metre and-----centimetre

5. Measure the length of the given matchbox with a metre ruler and a measuring tape. Could you measure it accurately? ----------
6. Was it possible to measure in metre? ----------
7. Now measure the length of the matchbox with the ruler in your compass box
8. Length of the matchbox --------centimetre and ------ millimetre = ------millimetre
9. What relation do you see between centimetre and millimetre?

----------millimetre = ---------- centimetre

Therefore,

**1 metre = ----------centimetre = ----------millimetre**

## Practice sheet 4

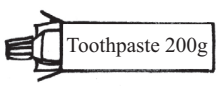
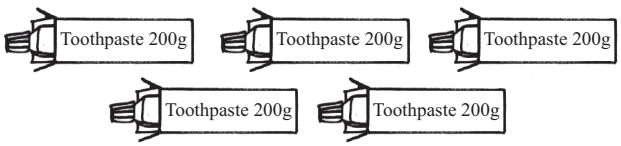
**Give the following things to the children. Ask them which measures they will use and accordingly write the measurements in the given table.**

| Name of the object | Metre | Centimetre | Millimetre |
|---|---|---|---|
| Length of a school bag | | | |
| Length of a saree | | | |
| Breadth of a magazine | | | |
| Length of a compass box | | | |
| Length of a table | | | |
| Breadth of a table | | | |

| Name of object | Metre | Centimetre | Millimetre |
|---|---|---|---|
| Height of a box | | | |
| Length of a matchbox | | | |
| Length of your hand | | | |
| Length of the nail of your little finger | | | |
| Length of your longest finger | | | |

## Practice sheet 5

**Make one kilogram. How many things will you need to make one kilogram?**

| | |
|---|---|
| Example   |   |
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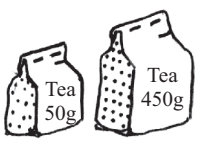
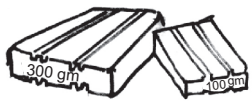
|   | |
|   | |

# Concept of Multiplication

Addition of the same number many times is multiplication. This means we are taking the number that many times.

For example, if one pen costs Rs 5 and we buy 10 such pens then the cost of 10 pens is 5 + 5 + 5 + … ten times. This means we have to take ten times 5. This is nothing but 5 x 10.

15 + 15 + 15 + 15 which is 4 times 15 that is 15 x 4.

Children confuse the addition (+) symbol and multiplication (x) symbol. It is necessary to clarify this confusion.

**1 to 10 times of a number is nothing but the table of that number.**

While teaching the concept of Tables, explain the relation between multiplication and addition. Explain this relation by using various methods like things, pictures, groups of children standing in a line. Once they follow this relation, the technique of multiplication is easy for them to understand. Do teach them, how a Table can be formed by repeated addition. There are different opinions as to whether children should memorise tables. All the same they should at least memorise tables from 2 to 9. It is sufficient even for doing multiplication of big numbers,. They are very useful while solving problems and also for daily transactions like buying vegetables, bus tickets, railway tickets and so on. Children will be able to do quick calculations and also verify the calculations done by others

## Counting numbers in stages

In the classroom, write numbers from 1 to 20 on the tiles on the floor. Call one child and ask him to start from number 3 and then jump in stages of three, ask another child to jump in stages of four. The other children will observe them and also correct them if they make a mistake. This automatically teaches them 'numbers in stages'. This helps in the learning of Tables and multiplication. .

## Activities of formation of Tables

1. Draw ten squares on the floor and keep two badges in each square. Children will count the badges, 2 + 2 + 2 +… ten times which leads them to number 20.

Explain that this counting is addition and the easy way to add is nothing but multiplication. From this we get

2 one time is 2 x 1 = 2

2 two times is 2 x 2 = 4

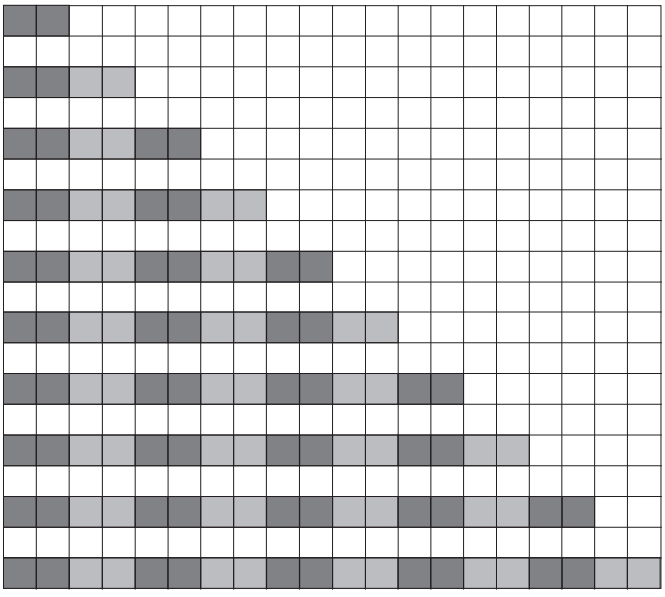
so on

2 ten times is 2 x 10 = 20.

Keep changing the number of badges in each square. This will teach them formation of tables of different numbers.

2. Square grid notebooks are very useful for the formation of tables.

**Formation of Table of 2 in a square grid note book.**



| | | |
|---|---|---|
| = 2 | = 2 x 1 | = 2 |
| = 2+2 | = 2 x 2 | = 4 |
| = 2+2+2 | = 2 x 3 | = 6 |
| = 2+2+2+2 | = 2 x 4 | = 8 |
| = 2+2+2+2+2 | = 2 x 5 | = 10 |
| = 2+2+2+2+2+2 | = 2 x 6 | = 12 |
| = 2+2+2+2+2+2+2 | = 2 x 7 | = 14 |
| = 2+2+2+2+2+2+2+2 | = 2 x 8 | = 16 |
| = 2+2+2+2+2+2+2+2+2 | = 2 x 9 | = 18 |
| = 2+2+2+2+2+2+2+2+2+2 | = 2 x 10 | = 20 |

While forming Table of 2, first join two squares and colour them. Tell the children that since we have taken group of 2 squares one time, write 2 x 1 = 2

Below that, tell them to colour 2 groups of two and ask them that by colouring 2 groups of two squares how many squares have they coloured? Children will count 4 squares, so ask them to write 2 x 2 = 4. In this way they can proceed to 2 x 10 = 20 to form the table of 2.

Before teaching multiplication, ask them questions and do activities like, 'Give twice the flowers you have to your friend', 'If each child has 5 sweets then how many sweets are there with 4 children?'. This will help them to understand the meaning of these words and also they will be familiar with them. They will also learn to associate it with multiplication.

In this section, on page 299, an activity with Dominoes is given to teach multiplication in a simple way.

After this stage, ask them to form simple word problems and to write them in numerical form. Also practice conversion of numerical problems into word problems. This enables them to understand the concept and technique of multiplication and also solving problems becomes easy.

### Some Activities of Multiplication

- Make cards of different multiplications and their answers, ask the children to match the answers.
- Take 10 cards of any Table and ask the children to arrange them in a sequence.
- Practice formation of word problems and also practice solving problems orally.
- To practice Tables, mix all the cards of tables from 1 to 10, spread them and then ask the children one by one to separate cards of any one Table.
- After the above activity, spread out cards of numbers 1 to 100. Ask one child at a time to pick up numbers from one of the Tables from 2 to 10. ' Cards from some of the Tables are missing, why does this happen?'. After picking cards from tables of 1 to 9, some cards remain on the floor, why?. These questions must be discussed with the children

Problems on Tables, factors and area which are related to multiplication can be solved using square grid notebooks. (refer to page 301, 302)

**The game Tic -Tac – Toe**

Two players can play this game. Some numbers are given on the last line. The players have to multiply any two and put a 'cross' or a 'circle' turn by turn on the product. The player who can complete a vertical/horizontal /diagonal line first will win the game.

For example, Player 1 (X) Player 2 (O)

4 x 7 = 28 7 x 3 = 21

7 x 5 = 35 3 x 5 = 15

| | | |
|---|---|---|
| (15) | 14 | 12 |
| 6 | ~~28~~ | 20 |
| (21) | 8 | ~~35~~ |
| 3, 5, 7, 4, 2 | | |

## Concept of Even and Odd numbers

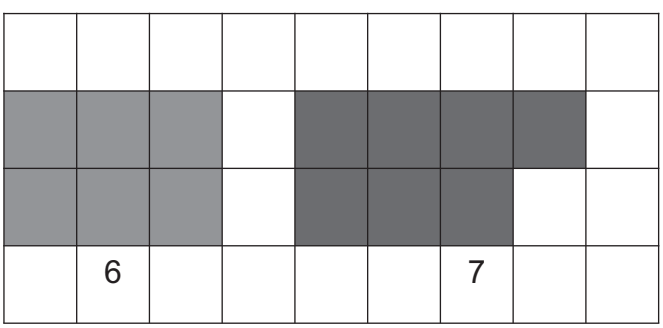
A number which is completely divisible by 2 is said to be an even number and a number which is not completely divisible by 2 is said to be an odd number. This concept is easily understood with the help of games.

In the game, "Storm is coming, Wind is blowing", Tai should ask for making a 'group of 2'. Children will then stand in pairs. If all the children are paired then number of students is 'Even' and if one child remains then the number of students is 'Odd'. This concept should be explained by Tai.

Tai should tell the children about the 'Divisibility test for 2'. If the digit in the 'Units' place of a number is 0, 2, 4, 6 or 8 then the number is completely divisible by 2. Tell the children different numbers and ask them to identify whether they are even or odd, by using the divisibility test for 2.

**Teaching Even – Odd numbers using square grid note books.**

- Tai should give any number and children should



colour pairs of squares as shown in the figure below. If a rectangle is formed, the number is even and if one square is left out then it is an odd number.

- Number of leaves on the branch of a Neem tree is always odd. On the other hand, number of leaves on the branch of the Rain tree (Shirish) tree are even.

Branch of Neem Tree

Branch of Rain tree

- Tai should give each child some objects and a number card. Children should count those many objects and then pair them, then identify whether the number is even or odd.

## Concept of Division

Division is making equal parts of any given number. Children are already aware of making equal parts and distributing things in equal numbers. While learning Division, it is important that the children know the words in mathematical language and their correct meaning. Many children find Division difficult. They can orally divide the amount of Rs 500 amongst 5 people as Rs 100 each but they find it difficult to do the actual division 5 500 in their notebooks.

To understand Division, they must know subtraction by borrowing, tables and place value of any digit in a number.

Division has to be done for two types of problems First, to distribute equally and second to make equal parts.

For example, 1) If 30 flowers are equally distributed among 5 girls then how many flowers will each girl get? This is equal distribution.

2) If each girl is given 5 flowers then 30 flowers can be distributed amongst how many girls? This is making equal parts.

In both these examples, division has to be done.

Initially simple examples using objects and activity should be taken so that the children understand the concept of Division. For example, 'If 15 flowers are equally distributed among 3 children then how many flowers will each child get?' Ask different questions to the children while they are doing the activity like 'How many flowers are to be equally distributed?' Children will answer '15 flowers.'

That which is equally distributed, which is made into equal parts, the number which has to be divided is called the 'Dividend'. So, in this example '15' is the dividend.

'15 flowers have to be distributed amongst how many children?' Children will answer '3 children'. The number by which we divide is called the 'Divisor'. Here the number '3' is the divisor.

Now children should start distributing 15 flowers to 3 children. First each one will get 1 flower.

| | |
|---|---|
| 15 | |
| - 3 | 3 flowers have been distributed. |
| 12 | remaining flowers |
| - 3 | 3 more flowers were given |
| 9 | remaining flowers |
| - 3 | 3 more flowers were given |
| 6 | remaining flowers |
| - 3 | 3 more flowers were given |
| 3 | remaining flowers |
| - 3 | 3 more flowers were given |
| 0 | remaining flowers |

After giving each child 1 flower 5 times, each one will have 5 flowers.

Immediately following the above activity, ask the children to distribute 16 flowers to 3 children. Now each one will get 5 flowers and 1 flower will remain. As there are three of them and only one is remaining, it is not possible to give 1 flower to 3 children. This remaining 1 flower or '1' is said to be the 'Remainder'.

Solving such simple problems using things, the children will realise that by using tables they can get the answer quickly. There is no need to keep distributing one thing at a time. In the above example, 15 divided by 3 is 5 as three

times five is 15, and remainder is zero. In the next example, 16 ÷ 3, ask them to say the table of three till we get a number less than 16 which is 3 times 5 is 15.This means that each one will get 5 flowers and 1 flower will remain.

Now introduce ÷ the symbol of division.

Explain to the children the relation between multiplication and division. For example, show the multiplication 3 x 2 = 6 with the help of objects. If these six objects are divided into 2 equal parts, then each one will have 3 objects. Also if we divide into 3 equal parts then each one will get 2 objects. This means that 3 x 2 = 6 implies 6 ÷ 2 = 3 and 6 ÷ 3 = 2. This is the relation between Multiplication and Division. Practice more such problems with the children.

First practice with numbers which are completely divisible and then proceed to division with remainders. After that practice division of big numbers. While solving problems on division make use of notes of rupees 1, 10 and 100

Give the children one note of Rs 10 note and ask them to divide among 3 children. One or two children can be 'Bankers', give them lots of notes of Rs 1 and Rs 10.

There is only one note of Rs 10, so how to distribute it? Now what to do? Children will say that we can get 10 notes of Rs 1 from the bank. Now each child will get Rs 3 and one note of Rs 1 will remain. The children may also distribute one note at a time, doing it three times. Some children may say the table of 3, ' 3 times 3 is 9, so each child will get Rs 3' and will directly give Rs 3 to each one and will be left with Re1.

First solve some problems on division using currency notes. Next, the children will solve a problem using notes and then Tai will show how to write and solve the same

## Why do children find Division difficult?

- To understand any Mathematical concept it is necessary to understand the previously learned concepts. To solve problems on Division, it is important that they understand and also are able to apply concepts like Smaller- greater numbers, place value, expanded form of numbers, simple and subtraction and subtraction with carry over, tables, forming tables of big numbers.
- While solving problems on addition, subtraction and multiplication, they write numbers one below the other and start working from the 'Units' side, writing the answer below it. The process of solving problems on division is totally different. We have to start at the highest place value and the answer is written above. The answer in Division is in two parts. The 'Quotient' on top and the 'remainder' below. These differences are not discussed with the children.
- They do not understand the terms dividend, divisor, quotient and remainder, nor do they know where to write them.
- In division, we do not write the dividend as units, tens, hundreds. So the children do not realize the place value of each digit.
- When, why and how to use zero in division is also very confusing.
- Terms like, number is divisible, bring down the digit are difficult for them. They do not know exactly what is to be done.
- While solving problems on Division, at every step they have to know, among how many to equally distribute, maximum number that can be given. They have to estimate at each step. Also at every step after distribution, they have to check that the remainder is smaller than the divisor.

Now we realize that of the four basic mathematical operations, division is the most complicated one! Hence it is natural that the children find division difficult.

problem on the blackboard. Let us see some examples –

Rs 300 are to be equally distributed among 3 children. So the children will give each child one note of Rs 100. Now let us see how to write and solve it. Write hundreds, tens and units for the dividend.

| | | | |
|---|---|---|---|
| | 1 | 0 | 0 Quotient |
| Divisor 3 | H | T | U |
| | 3 | 0 | 0 Dividend |
| | - 3 | | |
| | 0 | 0 | |
| | - | 0 | |
| | | 0 | 0 |
| | - | | 0 |
| | | 0 | 0 Remainder |

We have 3 notes of Rs 100,that means we have 3 Hundreds, so write '3' in the house of Hundreds. These have to be equally distributed among 3 children, so each one will get 1 hundred. Now 3 times 1 is 3, so we have 1 as the answer. Hence write '1' on top of Hundreds and 3 below as we have distributed 3 hundreds and subtract it. So now there are no hundreds or we get '0' hundreds. Also we now have 0 Tens, so each one will get 0 tens. Similarly, Units are also zero, so each one will get 0 units. So the answer or Quotient is 100 and remainder is zero.

One more example,

Rs 35 have to be equally distributed in 5 children. There are 3 notes of Rs 10 and 5 notes of Re 1. It is not possible to distribute 3 notes of Rs. 10 amongst 5 children, so we have to get some change. They will exchange the three notes of Rs 10 for 30 notes of Rs 1. Now they will have 35 notes of Re 1. While distributing, some children may give one note at a time and come to the answer 7. Some may use the table of 5 and conclude the answer as 7. Thus all 5 children will get Rs 7 each.

Now let us see how to write and solve the same problem.

0 7

| | | | |
|---|---|---|---|
| | 0 | 7 | Quotient |
| Divisor 5 | T | U | |
| | 3 | 5 | Dividend |
| | - 0 | | |
| | 3 | 5 | |
| | - 3 | 5 | |
| | 0 | 0 | Remainder |

Let's start from the Tens. There are 3 Tens, so they cannot be distributed among 5 people hence no one will get a ten. So write 0 in the Tens place at the quotient. Now there are 30 one rupee notes from the 3 Tens and 5 one rupee notes. so in all 35 one rupee notes. . Now say the table of 5 till you reach 35. 5 times 7 is 35. This means that each one will get Rs7. Write 7 in the Units place at the quotient. So each of the 5 people gets 7, thus Rs 35 have been distributed. Subtracting 35 units from 35 leaves remainder zero. Answer or quotient for the division is 7.

Currency notes are very useful to teach division of 2 digit numbers as well as greater numbers. For example, $60 \div 3$, give 6 notes of Rs 10 and ask them to divide in 3 parts. Each part will have 2 notes of Rs 10 which is Rs 20. Children can actually see this division. Now suppose Rs 50 are to be divided into 2 parts. Each one will get 2 notes of Rs 10. But the fifth note of Rs 10 cannot be divided in 2 parts, so it has to be exchanged for 10 notes of Re 1. The children will now be able to divide these 10 notes in 2 parts.

## Activities for Division

- Tai should distribute some objects like seeds, stones, sticks, leaves to the children. Ask the children to count them. Next ask them to make groups of 2 each then 3 each. Ask them about the number of groups they could form.
- Tai should ask them to count the number of children in the class. Give them any number and ask them to form groups of that number. Change the number and repeat the activity.

## Playing Card Game for Division

Take a set of playing cards; remove the picture cards jacks, queens and kings and also the Tens. Leave the jokers in the set. The joker represents zero and the ace is one. Thus we have 4 types of cards from 0 to 9 in our set. We will now use these cards to form numbers. Ask all the children to sit in a circle. One child should pick 2 cards from the set, place the first one in the house of Tens and the second one in the house of units. For example if he has an 8 and a joker then his number will be '80'. Now play the dice, he should divide 80 by the number he gets on the dice. Suppose he gets 6 on the dice then everyone should do 80 ÷ 6, either orally or on paper. Those who get the right answer, 13 quotient and remainder 2 will get a red token, whereas those who get the wrong answer will get a black token. At the end of the game, the one who gets maximum red tokens wins the game. Also ask everyone to subtract number of red and black tokens he has. .

- Initially take division of a two digit number by a one digit number.
- Next take three digit numbers by selecting 3 cards from the set. First card in the hundreds place, second in the Tens place and third in the Units place.

At the beginning use a dice with numbers 1 to 6, later make a dice with greater numbers.

# Fractions

### Introduction to Fractions

When we go to the market, many times we buy quarter kg tea, half kg sugar, one and half litre milk etc.. Sometimes when we are not hungry, we eat only half aroti, we share a guava among four friends. We use fractions easily in our daily life yet when we come across them in Mathematics we are confused.

Fraction means 'something that is not complete' or part of a whole number'. Many things like number of students in a class, trees in a garden, bicycles on a stand are counted in whole numbers. But to count certain things accurately, we do need fractions. Children can easily write numbers like 3, 1, 15, 28, 13 and 45 in ascending order. But not only children but even adults find it difficult to arrange fractions like $\frac{3}{7}, \frac{1}{4}, \frac{9}{8}, \frac{5}{6}, \frac{2}{9}$ in ascending order. Most of the students find fractions difficult, so it is necessary to be familiar with them in earlier grades.

We write division in the form of fractions. In a fraction, the number above the line is called the numerator (dividend) and the number below the line is called the denominator (divisor). For example, when we make 5 equal parts of one whole thing and take 2 such parts then we show this as a fraction $\frac{2}{5}$ . This is read as '2 upon 5' or '2 by 5'.

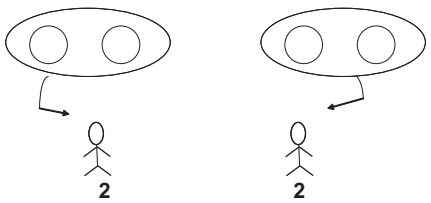
While teaching fractions make use of different things like square papers, rectangles, circles, graph paper, rope, lines drawn on the floor, number line, cake, roti etc. Treat each object as one whole and then divide into equal parts to teach fractions.

## From Division to Fraction

Cut out some circles of same size from a newspaper. Tell children that these are 'Rotis'. They should use these Rotis to answer the following questions.

Some children may draw rotis on the blackboard and answer.

1. If 4 rotis are given equally to 2 children then how many will each child get?



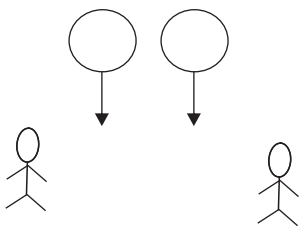

Each one will get 2 whole rotis.

We have done the division $4 \div 2$.

This in fraction form is $\frac{4}{2}$ which is $\frac{2}{1}$.

We write, (4 by 2) = (2 by 1)

2. If 2 rotis are equally given to 2 girls then how many will each one get?



Each one will get one whole roti. $2 \div 2 = 1$

In fraction form this is written as

$\frac{2}{2}$ (2 by 2) = $\frac{1}{1}$ (1 by 1)

In both the above examples, numerator was greater than or equal to the denominator. Also the numerator was divisible by the denominator. So the quotient was a whole number.

If any number is divided by 1 then the quotient is the same number. So any whole number can be written as a fraction.

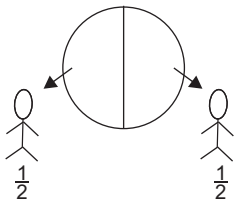
For example, the number 5 can be written as $\frac{5}{1}$.

## Proper Fraction

1. If 1 roti is distributed equally among 2 people then how much will each one get?

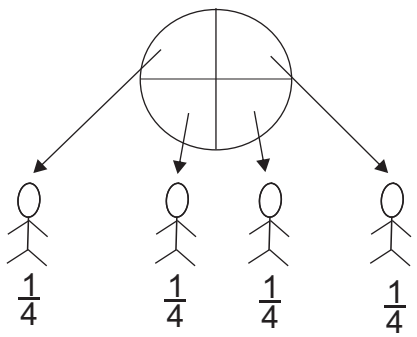
One whole roti is divided into 2 equal parts and each one will get one part.

$1 \div 2$ means $\frac{1}{2}$ (1 by 2). This means each one will get one part of the 2 equal parts or half the roti.



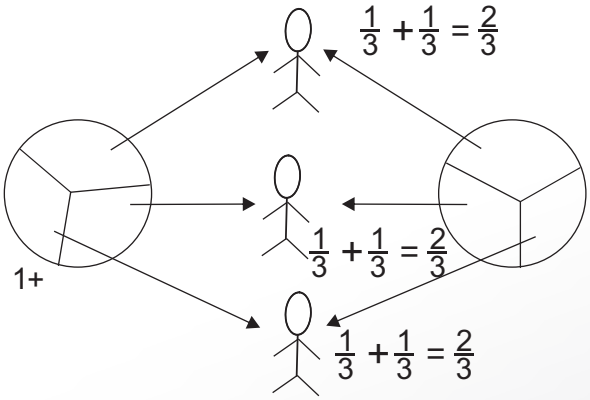

2. If one roti is equally given to four people then how much will each one get?

Four equal parts are made of one whole roti and each one will get one part.




$1 \div 4$ means $\frac{1}{4}$ (1 by 4). Each one gets one part out of the 4 equal parts that is a quarter roti.

3. If 2 rotis are equally divided in 3 children then how much will each one get?



2 rotis are to be equally divided among 3 children so we make 3 equal parts of each roti and give one part from each roti to everyone. So out of 3 parts each one gets 2 parts which is $\frac{2}{3}$ of a roti.

$2 \div 3$ means $\frac{2}{3}$ (2 by 3).

In all these three examples, the numerator is smaller than the denominator.

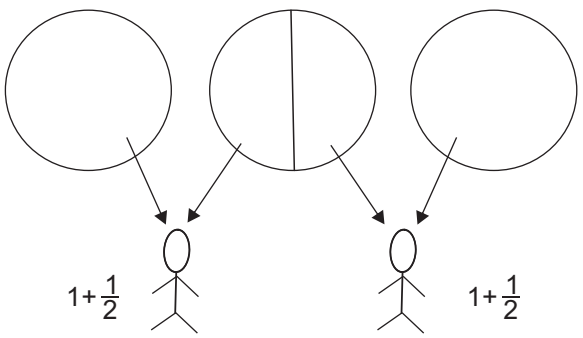
In each example, the number of rotis was less than the number of people who were to get the equal parts.

**In a fraction, if the denominator is greater than the numerator then it is said to be a Proper Fraction. For example,** $\frac{1}{2}, \frac{1}{4}, \frac{2}{3}$

The value of a proper fraction is always less than 1.

## Mixed Fraction

If 3 rotis are equally divided among 2 children then how much will each one get?




3 rotis are to be equally distributed between 2 people. First each one will get one whole roti. Next divide the third roti into 2 equal parts which means each one will get $\frac{1}{2}$ roti more. So each one will get $1\frac{1}{2}$ rotis. This is written as $1\frac{1}{2}$ and read as one whole and 1 by 2. Explain to the children that this means $1\frac{1}{2}$ and not $1 \times \frac{1}{2}$.

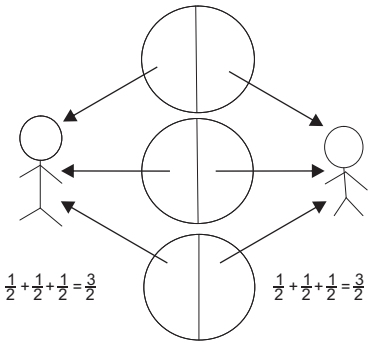
These fractions are called Mixed Fractions.

Hence while dividing $3 \div 2$, each one gets one whole and the remaining one is divided into two equal parts and half part is given to each one.

Thus in all, each one gets $1+\frac{1}{2} = 1\frac{1}{2}$.

**Improper Fraction**

3 rotis can also be equally distributed among 2 children in the following way.




Each roti can be divided into two equal parts. Each one will get half of all the 3 rotis.

Thus each one has $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=\frac{3}{2}$

The fraction in which the numerator is greater than the denominator is called an Improper Fraction.

In both the above examples, we have equally divided 3 rotis among 2 children.

In mixed fraction it is written as $1\frac{1}{2}$ and in improper fraction as $\frac{3}{2}$. Thus,

$1\frac{1}{2} = \frac{3}{2}$. The reasoning for this is as given below,

$1\frac{1}{2} = 1 + \frac{1}{2} = \frac{2}{2} + \frac{1}{2} = \frac{2+1}{2} = \frac{3}{2}$

For converting a mixed fraction into an improper fraction, the numerator will be (whole number x denominator + numerator), whereas the denominator remains same.

For example: $2\frac{3}{5} \quad \frac{(2\times 5)+3}{5} = \frac{13}{5}$.

While adding/ subtracting fractions, we have to make the denominators same and then add/subtract the numerators. This is because the denominator represents the number of equal parts made and the numerator is the number of parts taken.

When converting an improper fraction into a mixed fraction, first write the whole number that we get on dividing the numerator by the denominator and then write the remainder divided by the same denominator.

For example, $\frac{26}{5}$.

In this improper fraction, we divide 26 by 5. As 5 x 5 = 25, the quotient is 5 and remainder is 1. So we write this as $\frac{26}{5} = 5\frac{1}{5}$

For clear understanding of fractions it is necessary to practice with activities like recognizing fractions from a picture, colouring parts as per the given fractions, using circles-squares-rectangles of paper as one whole and then dividing into equal parts which can be coloured as per the given fraction. While doing these activities, the children automatically learn the concept of fraction.

# Measurement and Mathematical operations

Measurement can be related to various mathematical operations, so that both the concepts can be understood thoroughly.

## Addition and smaller - greater numbers

Give the children 2/3 sticks of different lengths. Ask them to measure with a ruler or a tape. Next tell them to arrange them according to their lengths. Ask them to find the total length of the sticks for which they will have to add the lengths. Tai should take care that the length is in whole number. As this involves an activity, the children understand the concept and readily add the numbers. Subtraction can also be taken by asking which stick is longer and by how much.

Addition can also be taught by measuring the length of the sides of a slate, notebook and then finding its perimeter. After solving problems by this method, children learn to think about word problems.

## Multiplication

To understand multiplication activities of measurement, give the children a saree or a dupatta and ask them to measure it. Some children will measure with a tape whereas some may fold it into equal number of folds and measure one fold, which they will multiply by the number of folds. From this activity they learn that multiplication is nothing but adding many times. Count the number of tiles on the floor of a rectangular room and then show how to relate to multiplication. Tell them to count the number of tiles along the length of the room and also the length of one tile measured by a ruler or tape in centimetres and make a note of it. Do the same activity for measuring the breadth of the room. Length of one tile multiplied by the number of tiles along the length of the room gives the length of the room. Similarly, ask them to find the breadth of the room. From the length and breadth of the room they can also find the area of the room.

## Division

If we want to measure something which is very light in weight, we have to use an electronic weighing scale or the one which the jewellers use to weigh gold. If such a weighing balance is available then the following activities can be done. Give the children some small things which are light and equal in weight, for example coins, and ask them to weigh them. Tai should weigh these objects before giving them to children. The number of things should be such that the total weight is divisible by that number. So that it will be easy for children to divide and find the weight of each object. For example, the weight of 2 rupee coin is 50 grams, so give the children such 10 coins in a small plastic bag. Ask them to weigh on a spring balance. Children will divide the total weight by 10 to get the weight of one coin. This will help them to understand the concept of division, it will also be useful in solving word problems. Children from grade 4 and 5 can easily do this activity.

Similarly take some peanuts or tamarind seeds in a pouch and ask children to weigh it. Then ask them to count the pea nuts/ tamarind seeds in the pouch. And divide the total weight by that number to get the approximate weight of one pea nut/one tamarind seed.

## Measurement Fair

A measurement fair/ workshop can be arranged for 2-3 days for the children. This will help them to understand the significance of 'measurements' in their daily life. They learn through activities, tally their guesses/ estimates and the actual measurements. The basic operations of addition, subtraction, multiplication and division can also be very well understood through these activities. In addition some activities through which they can learn from their surroundings are also given here. They will develop their mathematical skills and abilities; relate mathematics and actual experiences in life. Many such objectives can be achieved through such measurement fairs.

In this fair, you can use the practice sheets given above to conduct activities. In addition some more activities are given below.

## Measuring the height of the house

Ask the children, what they can do to measure the height of a house. We can also give some alternatives. For example,

1) Tie a stone to the end of a rope and let it come down from the terrace. Measure the length of the rope.

2) Measure the height of one step of the staircase and count the total number of steps. This will give the height of one floor.

## Weighing different objects

Using a weighing balance and weights, children can weigh different objects like vegetables, jaggary, glass for drinking water etc.

Teach them how to use a weigh balance. How to hold it, how to keep it down on the floor (it should be on level ground, not uneven),the arrow should be at the exact centre when both sides are empty, which means it is perfectly balanced.

Ask the children to measure the weight and height of each other. Ask questions like, 'How to weigh an elephant? It will definitely make them think.

## Weight and Volume

Children are often confused between weight and volume. Weight is the heaviness of the object whereas volume is the space occupied by it. Liquids always flow, so we weigh them with the container and then subtract the weight of the container from the total weight to get the weight of the liquid. So generally, it is easy to find the volume of a liquid. Ask the children to actually weigh the liquids, one litre of milk, one litre of oil and one litre of water and also measure their volume using the measuring cylinder. Now discuss why there is a difference in their weights even if their volumes are same.

Various packets have their weights and volumes written on it, so take an activity to read and understand their meaning. Include commonly used things like toothpaste, soap, shampoo, oil for this activity.

### Tell the children the story 'How a king weighed an elephant'.

Once a king fell very ill. All the Doctors and Vaidyas from various places and countries tried to cure him. But he did not get well. Finally he declared that, 'Whosoever cures me will get gold as much as the weight of an elephant'

Days passed by. One day an old man, a Vaidya from a faraway place came there. What a surprise! He cured the king in two days. Now he had to be rewarded as promised by the king. But the question was 'How to weigh an elephant? Where to get a weighing balance to weigh an elephant?' The Pradhan/Chief of the king came up with an idea. He called everyone, next day near a lake. He himself came there with a boat and an elephant. He first slid the boat in the water and then marked the water level on the boat. Next, he let the elephant into the boat and again marked the water level. He then took the elephant out of the boat and put gold in the boat till water reached the mark on the boat when the elephant was in it. Thus he got the gold as much as the weight of the elephant. The king gave the gold to the old man who happily went back to his town.

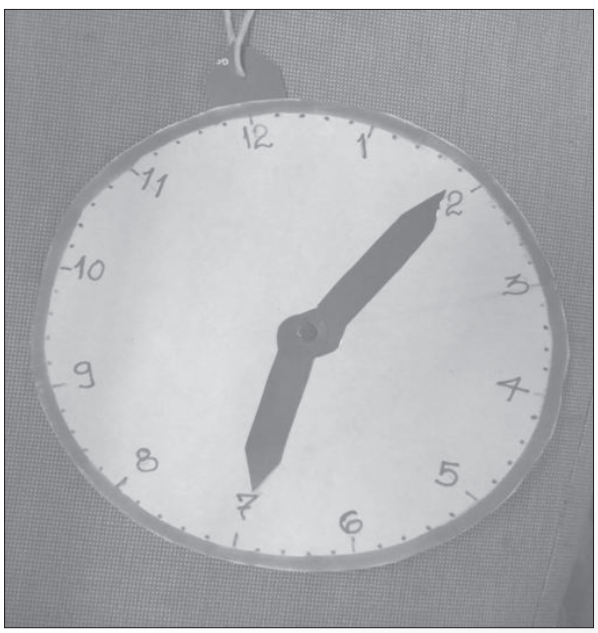
## Measuring Time

Before actually teaching measurement of time, it is important that the children are familiar and understand terms related to time. Create and take various activities to teach the concept of 'Time measurement'.

Age group: Grade 2 and 3

- Show the children pictures/photographs of the sky taken in the morning, afternoon and night. Ask them to identify the time shown in the picture.
- Ask the children to make a Time-table for the school, Khelghar and home.
- **Making a clock from a paper dish**

This activity helps the children to understand the clock. First explain to them the actual clock, its hands and the numbers on it, and then take the activity of making a clock.



Material - Paper dish, small cardboard, pin, sketch pen etc.

Activity - Make two hands of the clock, small and big from the cardboard, write numbers on the paper dish as on the clock. In the centre, ask the children to draw any picture they like. Now fold the paper dish twice to find its exact centre. Put the pin through the two hands and then pierce it at the centre of the clock, fold it on the backside and put tape on it so that it will not come out nor will it hurt.

Once the clock is ready, ask the children to show different times on it by moving the hands of the clock.

This clock can also be used to show angles and its different types to children of higher grades.

**"Tiger, tiger, what's the time?"**

Draw a big picture of a clock on the floor, ask one child to stand at its centre. Give two sticks in his hands, one big and one small. These sticks will be the hands of the clock. The child standing at the centre should ask the children outside "Tiger, tiger, what's the time? They will tell him the time and then he would show that time with the two sticks representing the hands of the clock. If he goes wrong, the others should help him. Tai would explain his mistake. After two rounds, another child will come in the centre and ask for the next time to be shown on the clock. Tai should take care that each child gets an opportunity to stand in the centre. Children understand reading of the clock very well through this activity.

## Calendar

Calendar is a very useful aid. It can be used right from number identification to basic operations in different ways. 'Time measurement' can also be taught with the help of the calendar.

- After teaching numbers 1 to 9, ask the children to identify where a particular number is on that page. Give each child one page of an old calendar and ask him to circle the particular number.
- Introduce them to the Days on the calendar. Every day, show them the day and date on the calendar and write it on the blackboard. Even if they have not been taught numbers after 9, do this activity every day.
- Children of grades 2 and 3 can be introduced to months. Teach them the Hindu months also. So that they can be introduced to the various festivals and their English dates and 'tithi'
- Calendar can be used to teach numbers in stages. For example, stage of 2 gives numbers 2, 4, 6, 8…20; stage of 3 gives numbers 3, 6, 9, 12…30.
- There are seven days in a week. Explain to the children that the next date of the same day can be obtained by adding 7 to the date. For example, this Monday the date is 2 then the next Monday the date will be 9, after that it will be 16.
- Given below are cards showing dates. Give the day and date of one card and ask them to write the day and dates in the given blank boxes. After this you can give different days and dates and ask them orally what to write in the blank boxes.


- Show the calendar to the children. Tell them the relation between date and day, about a week, why is it called a week. Ask them, today's day and date, the date and day after one week, number of weeks in this month. By asking such questions their concepts will be clear.
- **Birthday and year**

Help the children to make a calendar for the whole year. On it, show the birthdays of all the children. Ask them questions like, on the calendar where is the year given, can you find your age as of today. Similar questions will make them think and also clarify their concepts.

## Making a calendar for Khelghar

Discuss the programs of the month with the children. Tell them, "Let's make a calendar for this month, so that we remember the dates and also the others will know the dates of our program".

Ask the children to make a calendar on a large card sheet. They can draw squares on the card sheet and on it write the month, day and date to make the calendar. Now tell the children the dates of the programs in that month and then with the help of the children write it in the square of that date. Next, ask the children about birthdays in that month and write them on the calendar. Also write the festivals in that month. Any important events in the school can also be written on the calendar. For example, school holidays, exams etc. This can be done every month around the 4th – 5th of the month. Discuss whether the programs noted in the last month were executed or not.

## Fun with Calendar


5 + 6 + 7 + 12 + 13 + 14 + 19 + 20 + 21 = 117

\ 117 ÷ 9 = 13

Select any square of four dates on the calendar. For example,

| | |
|---|---|
| 18 | 25 |
| 19 | 26 |

Here the sum of the diagonal numbers is same. 18 + 26 = 19 + 25 = 44.

This is true for any square of 4 dates on the calendar.

Similarly, if we take a 3 x 3 square, add all the numbers and divide by 9, we get the middle number.

For example,

| | | |
|---|---|---|
| 5 | 12 | 19 |
| 6 | 13 | 20 |
| 7 | 14 | 21 |

5 + 6 + 7 + 12 + 13 + 14 + 19 + 20 + 21 = 117

∴ 117 ÷ 9 = 13

There are in all 9 numbers, so the sum of the numbers is a multiple of 9.

In this way, we can find many more relations.

- For example, sum of numbers in the corners is same.
  21 + 5 = 26
  19 + 7 = 26
  14 + 12 = 26
  20 + 6 = 26

- • Sum of diagonal numbers is equal.
  7 + 13 + 19 = 39
  5 + 13 + 21 = 39
  'Magic rectangle' in the calendar.

| | | | |
|---|---|---|---|
| 1 | 8 | 15 | 22 |
| 2 | 9 | 16 | 23 |

Any 4 x 2 rectangle on the calendar will reveal this magic.
1 + 23 = 24
22 + 2 = 24
9 + 15 = 24
16 + 8 = 24

- Once they follow the order of the dates on the calendar. Ask them questions like, 'How many days are there between date 2 and 10?'
- Finding dates before and after from the given Day. Today is Tuesday 15th.
  'What will be the date next Tuesday?' 'What was the date last Tuesday?'
- Finding the day from the given date. 'The 4th was a Tuesday, so what day will it be on the 8th?'

## Playing 'Shopping'

This game can be played with children of any age group, according to their needs and abilities. In this game, all the mathematical operations can be practiced. This game can be made easy or difficult as per the requirement.

Collect various things from the classroom like pencils, pens, erasers, note books, books, compass box, flowers, leaves, papers, coloured chalks, marbles, balls etc. Make currency notes with card sheets, of ₹ 1, 10, 100,1000 or buy them from a toy shop. Children love to use them.

To play this game with the children

- Decide the number of shops as per the number of children and their abilities.
- Decide what things are to be kept in each shop and also the price of each thing. Put a chart of the price list near each shop.
- Make a list of things and their quantities in each shop.
- Divide the children in two groups, shopkeepers and buyers. After one transaction, the groups can be interchanged and the same transactions can take place.
- Children like to name their shop and decorate it.
- Give some money to both the shopkeepers and the buyers. Ask them to note down the given amount.
- Write some transactions on a piece of paper and give one to each buyer and direct him to visit particular shop. Initially, give transactions with addition and subtraction, later give them multiplication and division, the problems and prices should be set accordingly.
- Once they do the transaction as per the note given to them, ask them to write it as a word problem in their notebooks.
- Ask them to solve this word problem in their notebook. In this way, they can tally what is actually done and that which is solved in the notebook.&

As an example, below is given the formation of five shops with instructions for the shopkeepers and buyers. This game can be played with a group of 20 to 25 children for one to two hours. Before starting the game, prepare the material required by each group, money, transaction notes and decoration of the shops.

After the game, each child should write his transaction details and calculations on a paper and show it to Tai. Each shopkeeper should also write his calculations. The same game can be played again by interchanging the groups of shopkeepers and buyers. The children gain confidence from this game. They also learn, numbers, change, tens, hundreds, addition, subtraction, multiplication, give and take of change of coins, skills in buying and selling, what they can buy from the money they have and also what they could not buy.

This game can also be connected to 'measurement'. For example, give them some measures like weights and measuring tapes, ask them to sell by weighing or measuring length with a tape. In this you can use vegetables, grains, sand, water, paper rolls, sarees, curtains, rope for selling.

After playing 'shopping' and learning various mathematical operations in it, study the examples of formation of shops given below.

| Shop Number/ Name | Object - Price | Instructions for Buyers | Instructions for Shopkeepers/ Sellers |
|---|---|---|---|
| 1.Prabhat stores (Addition shop) | Box of coloured chalks – Rs 12<br>Pencil box –Rs14<br>Eraser – Rs 3<br>Ruler – RS 5 | Amount to be given – RS. 20<br>(Rs 10 change, one note of Rs 10)<br>Buy any two things from Prabhat stores.<br>Calculate and give the correct amount to the shopkeeper. | Give the things asked by the buyer, calculate and take the correct amount. |
| 2. Ramesh Stores (Addition with carry forward) | Scissors – Rs 15<br>Pen – Rs 9<br>Stapler – Rs17<br>Sketch pen – Rs 5 | Amount to be given Rs. 35<br>(5 change and 3 notes of RS10)<br>Buy any two things from Ramesh stores | Amount to be given<br>5 rupees change<br>Give the things asked by the buyer, calculate and take the correct amount. |

| Shop Number/ Name | Object - Price | Instructions for Buyers | Instructions for Shopkeepers/ Sellers |
|---|---|---|---|
| 3. Bhagvati stores (Subtraction with borrowing) | Pencil box – Rs.11<br>Nail cutter – Rs.14<br>Sketch pen set – Rs 16 | Amount to be given – RS. 20<br>( 2 notes of Rs 10)<br>Buy any one thing from Bhagvati stores | Amount to be given<br>10 rupees change<br>Give the things asked by the buyer. Calculate and take the correct amount. |
| 4. Our Shop (Multiplication shop) | Pencil – Rs. 4<br>Eraser – Rs 3<br>Chalk - Rs 2<br>Chalk box – Rs 10 | Amount to be given -Rs.30<br>( 3 notes of Rs. 10)<br>Spend all the money to buy from Our Shop | Give the things asked by the buyer. Calculate and take the correct amount.<br>Amount to be given<br>10 rupees change |
| 5.Mayur corner (Division shop) | Pencils – Rs 30 for 10<br>Sketch pens – Rs 72 for a dozen<br>Erasers – Rs 24 for a dozen | Amount to be given – Rs 20<br>( 2 notes of Rs 10)<br>Buy three things from Mayur corner. | Give the things asked by the buyer. Calculate and take the correct amount. |
| Ask the children to write a word problem in their note books based on each buying and selling transaction. | | | |

## A Shop Fair

A Shop Fair, is a bigger version of playing Shopping. Here, besides mathematical abilities, many other abilities like motor skills, leadership, imagination, collaboration, group work and creativity are also developed. This fair can be arranged in their summer vacation or Diwali holidays. It has to be planned and worked out in great detail. It also needs a big budget. At least 10 days are necessary for all the preparations.

First make a list of things that can be made for selling. Select the things considering the capacity of the children and with their consent. For some things like imitation jewellery, scientific toys. Call some expert from outside to guide and teach the children and Tai. Check if it is possible to use old things which are no longer useful. Focus on involving the children in the preparations, so plan and see that they have sufficient time for it. Decide the date and invite guests and especially parents of the children for the Fair.

The following things can be included in this fair'

1 Greeting cards 2. Book marks 3. Batiq handkerchiefs 4. If its Diwali time then eatables like 'chivda, laddu', painted Diyas, skylamps 5. Saplings of garden plants, vegetables, medicinal plants 6. Jewellery –Earrings, chains etc 7. Toys, scientific toys 8. Beads and cloth festoons for the door, 9. Paper and cloth bags 10. Origami articles, 11. Decorative objects 12. Folders etc.

Things like, marriage invitation cards, pieces of cloth from tailors, discarded papers from printing press can be used to make these objects.

Take a judgement as to how much time the children will require to make the things, take into consideration their age and skills and then accordingly form their groups. Make a list of things to be made and the material required, by discussing the same with the children. Talk to the children about the cost of the required material and the quantity of the material to be bought. Make a note of prices and cost of the material. Once the list is ready, write the cost of making it. Also the time required to prepare that thing by the children and Tai should be noted and the duration of time and efforts involved should be explained to the children. After this the cost of each object can be determined.

One day before the fair, decide how and where to put up the stalls and who will manage each stall. Children should advertise what they are selling. Encourage them to name and decorate their stalls. Children love this activity. Also keep a stall of some eatables like 'Bhel' etc.

**After the calculations of all the transactions of the Fair, the children should fill up this chart.**

| Name of the object | Cost of making it. Cost Price (C.P) | Selling Price (S.P) | Is the Selling price more than the Cost price? Profit = S.P – C.P | Is the Cost price more than the Selling price? Loss = C.P – S.P |
|---|---|---|---|---|
| | | | | |
| | | | | |

Give each group, a fixed amount of change. At the end of the fair, check the number of things sold and the amount they have collected.

Next day after the Fair, discuss with the children about their selling experience, profit and loss, which things had more demand and things which were not sold.

Sometimes perishable goods like vegetables and eatables are not completely sold. In such cases, it is necessary to sell them at a lower price, so the money obtained on selling is less than its cost price. Hence there will be some loss.

For the 'Shop fair', invite parents, well-wishers, donors, friends and families. This 'Shop Fair' is a great opportunity to have dialogue with the Khelghar children, to appreciate their skills and efforts and buy various things from them.

After the experience of Shop fair we come to know the different skills and abilities of each child. This is the beginning of using Mathematics in their daily transactions.

Children understand clearly the various concepts in mathematics, practice them, relate them to daily transactions and use them in various activities. In this journey of learning they overcome their dislike and fear of Mathematics. They now, can visualise and understand Mathematics. Also unknowingly they learn to apply it. This experience enriches the children as well as the Tai.

**Shop Fair in Khelghar, 2010**