

Santosh's sister is going to be married in a week's time. Everybody in the house is busy with the preparations.

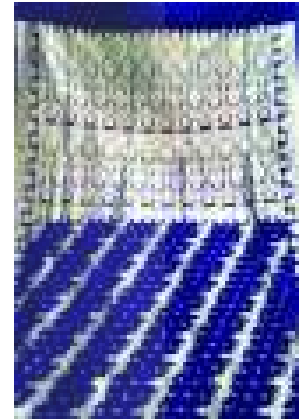
Today Santosh, his sister Anitha and their parents are going to the market, to shop for clothes. Anitha and her mother entered their favourite saree shop. They looked at many sarees and finally selected these-



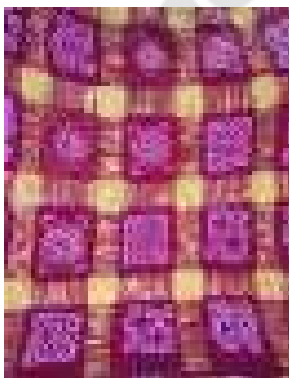
₹ 1500



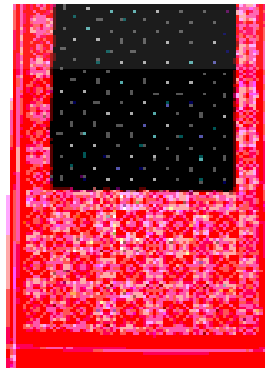
₹ 2000



₹ 3200



₹ 850



₹ 1300

Notice the different patterns on each saree. Also notice the patterns on your mother's sarees.

1. What is the total amount they spend on the sarees? \_\_\_\_\_
2. If they give ₹ 9000 to the shopkeeper, how much money will the shopkeeper return? \_\_\_\_\_

Meanwhile Santosh and his father went and looked at the men's clothes. They both bought cloth for their shirts and pants.



3. Given below is the bill that the shopkeeper gave them. Can you complete it-

Item	Rate per meter	Amount
1 m 50 cm pant cloth	₹ 150	
1 m 50 cm pant cloth	₹ 220	
2 m shirt cloth	₹ 140	
2 m shirt cloth	₹ 125	
<b>Total</b>		

### Buying sweets for the marriage

They then went to the sweet shop. They placed an order for 20 kg of laddoos and 20 kg of badhushaw. 1 kg of laddoos costs ₹ 120 and 1 kg of badhushaw costs ₹ 150.

1. How much will they pay to the sweet seller?
2. Santosh asked the shopkeeper to pack the laddoos in boxes of half kg. How many boxes of laddoo will the shopkeeper give them?





Father agrees to pay ₹ 12 for every kilometre travelled to the bus agency.

1. If the distance from Adilabad to Warangal and back is 500 km then how much will father pay for one bus? How much will he pay for all the buses he has hired?
2. If father has given an advance of ₹ 4500 to the bus agency, how much does he need to pay after returning home?

### Marriage party leaves for Warangal

On the day of marriage, the whole party started from Adilabad at 7 o'clock in the morning.

Tanu : When will we reach Warangal?

Aunty: If we don't stop anywhere, we should reach there in 5 hours.

Tanu : It is 7 o'clock now, so we will reach by \_\_\_\_\_

Manjeet: It is going to take us 5 hours so it must be far.

Aunty : It is about 250 km.

Tanu : Are we going to stop anywhere?

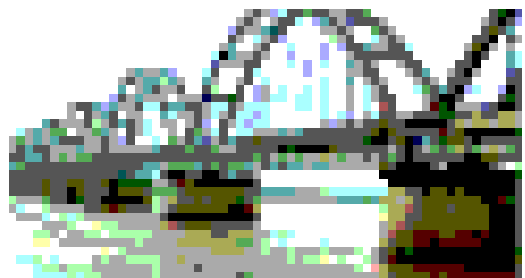
Anand : May be at Karimnagar, about 180 km from here.

1. At about what time will the buses reach Karimnagar?
  - (a) Before 10 o'clock
  - (b) Between 10 and 11 o'clock
  - (c) After 11 o'clock

Soon the children and young people started playing antyakshari and the bus was filled with melodious voices. Meanwhile the elders were enjoying the view of the beautiful forests and hills.

They crossed the Rayapatnam bridge on the beautiful river Godavari at the Adilabad border and children started excitedly looking outside the windows

Anu : Wow! Look how beautiful Godavari is. It is soooo.. big!



Arif : Uhhh... Is it 100 meters wide?

Madhavi : No, it must be more than half a kilometer wide.

Aunty : Look! It is written- The length of the bridge is 863 meters. So the river must be about 600 m wide.

1. If the bus that the marriage party was travelling is about 5 meters long, how many buses do you think can stand in a line on the bridge?

### Having tea and juice at Karimnagar

Discussing the Godavari, its beauty and its floods, the marriage party reached Karimnagar. They stopped for tea. All the elders wanted to have tea while the children and youth wanted to have juice. The shopkeeper was asked to prepare 90 cups of tea. 4, two and a half liter bottles of juice were also bought for the children.



1. How many liters of juice was purchased? \_\_\_\_\_
2. If each person drinks 1 glass of juice and 1 glass contains 100 ml of juice, then how many liters of juice was consumed? \_\_\_\_\_
3. If one cup of tea costs ₹ 5 then how much money need to be paid for the tea? \_\_\_\_\_
4. If 1 liter juice costs ₹ 18 then how much money need to be paid for the juice? \_\_\_\_\_

## Purchasing flowers

While everybody was having tea, Santosh went to buy flowers to greet the grooms family. He bought 35 cubits of jasmine flower garlands.



1. About how many cubits of jasmine will make a garland?
2. They reached Warangal safely at 1.30 in the afternoon. How much time did they take to reach Warangal?

The marriage at Warangal was a very happy occasion for both the families.

### Try This

1. What are the types of mathematical calculations that need to be made during marriages in your house?
2. What are the types of mathematical calculations that need to be made when your family go out for a holiday?

## **GUIDELINES FOR TEACHER**

### **Curricular and Pedagogical**

Dear teachers,

There are 17 chapters in this book. Broadly, they cover two areas- numbers and space. Building number sense at the primary stage involves an ability to read, write and understand bigger numbers as well as skill in the four fundamental operations- addition, subtraction, multiplication and division. It also involves seeing relationships between different operations for e.g., between addition and subtraction and between multiplication and division as well as engaging with properties of operations like commutative and distributive properties. Ability to engage with number patterns is also an integral part of a growing number sense. Fractions build up on the understanding of division and also prepare children for denser concepts such as percentages, ratios etc., as well as a growing number set, all these to come in the upper primary classes. Spatial understanding is about seeing the world in terms of 3D and 2D shapes, understanding the relationship between the 3D and 2D world, visualizing the world from different positions and also exploring patterns and symmetry. Measurements involve quantification of various spatial and non spatial concepts like length, weight, capacity, time and area and the use of the four operations in all these areas also consolidates number sense. Estimation remains an important part of both numbers and space. Data handling involves visualizing numbers through various types of pictures and graphs. We request you to help children enjoy both the numerical and spatial aspects of mathematics.

There are a few things that we would also like to mention about the nature of classroom transaction in a primary mathematics classroom. First, using concrete objects is essential at this stage. Some examples of concrete objects that are needed at the primary stage are dice, number cards, the 100 beads mala, meter rod, measuring tape, weights, clock, calendar, boxes of various shapes, bottles of various capacities, mirror etc. Second, concepts need to be placed in experiences that are meaningful for children such that children can see a connection between the mathematics they are doing in the classroom and the mathematics in the outside the world. The book makes an attempt to place concepts in situations that children can make sense of and we request you to also prepare more problems which will help children in relating concepts to local situations. Also encourage children to make their own mathematical problems and solve them. Third, there may be many ways to solve a problem. Please, encourage children to develop their own strategies to solve problems and also give space to them to discuss their strategies with each other. In fact, collaborative learning is a resource for the classroom and children should be encouraged to solve problems in pairs and groups.

You are also requested to organize field trips, metric melas, math exhibitions, learning corners, quiz, math club activities etc., whenever possible in the course of the year.

Lastly, we request all of you to read all chapters carefully and plan accordingly before you enter the classroom. We also feel that it would greatly benefit classroom transaction if you would solve all the problems given in a chapter before teaching it. There is also the expectation that you would arrange for whatever teaching-learning material (TLM) is required for building concepts, for e.g., a meter rope for length, one liter bottles for capacity etc.

A note about the books: Children have been provided space to solve problems not only at the end of the chapter but at various points during the course of the chapter. In fact, the process of concept building is a process in which the child is engaging in a dialogue with the text and space is provided to

him/her to articulate what he/she has understood at regular intervals. 'Do This' exercises provide children practice on the concept taught and are supposed to be done by the students on their own. 'Try this' exercises have an element of challenge to them and invite children to think. 'Think and discuss' problems again have an element of challenge and are also meant to be worked on in pairs and groups. The 'Exercise' given at the end of the chapter covers various learning points in the chapter.

**Some chapter-wise guidelines are given below-**

### **Shapes**

- Encourage children to identify both 3D and 2D shapes in objects around them
- Also encourage an exploration of actual objects of different 3D shapes so that children can understand their various features
- Provide space to children to articulate their understanding of these features rather than provide them with definitions
- Encourage children to open various kinds of boxes and observe their nets
- Create situations, where the children observe objects and locations from different views and encourage them to draw what they see
- Showing some local maps of the school, locality, village etc., and encourage children to locate places on them

### **Numbers**

- Help children understand the base 10 number system using contexts like the 100 beads mala, the number line, the 100 number table etc.
- Provide ample opportunities to children to make numbers from digits and compare numbers

### **Addition and subtraction**

- Encourage children to add and subtract bigger numbers as well as estimate sums and differences
- Create many more meaningful word problems of all three types- 'combine', 'compare' and 'change' structures and ask children to solve them. It is also important to give children opportunities to make word problems of addition, subtraction and also those which involve both operations

### **Multiplication**

- Encourage children to multiply bigger numbers as well as estimate products
- Create many more meaningful word problems of all types- equal groupings, rate product, array product and cartesian product (in class 5) and ask children to solve them. It is also important to give children opportunities to make word problems of multiplication
- Children should be given ample opportunities to split numbers at 10, 100 etc using the distributive law and then multiply
- Encourage children to see the relationship between multiplication and division as well as commutative and distributive properties of multiplication



## Division

- Encourage children to divide bigger numbers as well as estimate quotients
- Create many more meaningful word problems of all types- Grouping and Equal sharing, and ask children to solve them. It is also important to give children opportunities to make word problems on division as well

## Fractions

- Students use half, quarter, three fourth in their daily life without understanding them as fractional numbers. Use these meaningful experiences to introduce fractions to children
- In understanding fractions it is important for children to understand that the whole can be one object or a group of objects. It is also important for them to understand that the object or group of objects is being divided into equal parts
- It is also important to see the relationship fractions have with division and their entity as numbers on the number line

## Measurements

- Length, weight, time and capacity have been used to introduce children to the area of measurements
- Children have a variety of rich experiences in all these areas and they should be utilized in classroom transactions. In fact, children whose parents are involved in professions that constantly engage with various units of length, weight and capacity should be treated as an invaluable resource for the classroom
- A very important part of understanding length, weight, capacity and time is understanding how long a centimeter, meter etc is, how heavy a kilogram, few grams is, how much a liter is etc. So provide children opportunities to use a meter length rope, kilogram sack of sand etc and also the actual measures wherever possible
- Wherever possible use field trips and project works, which gives perceptual experience and make them to understand different measurements and their conversions

## Patterns

- Children see patterns all around them both in the man made world and in nature. Encourage children to identify the patterns they see all around them
- Encourage children not only to identify patterns but also create patterns of their own
- Encourage children to make number patterns

## Symmetry

- Encourage children to identify symmetrical objects all around them.
- Encourage children to see symmetry in nature around them.
- Encourage use of mirror in the classroom for understanding line symmetry

## Data handling

- Give children opportunities to collect data in their school and home surroundings and then organize it in different ways i.e., using tables, pictographs and bar charts.

# Syllabus

## I SPATIAL UNDERSTANDING (16 hrs.)

### Shapes and Spatial Understanding

- Identifies 3D shapes in objects (without using the names of the shapes)
- Identifies the edges and corners of 3D shapes
- Distinguishes among 3 D shapes based on their ability to roll and slide
- Identifies the side view, top view, front view of simple objects/ plans
- Identifies the nets of cuboid and cube shaped boxes
- Identifies 2-D shapes viz., rectangle, square, triangle and circle by their names
- Identifies 2D shapes in objects
- Making pictures using known 2D shapes
- Making shapes on the dotted board
- Understands the meaning of perimeter and can calculate it
- Explores line symmetry through reflections, paper cutting, paper folding etc.

### Patterns (3 hrs)

- Identifies, carries forward and makes visual patterns

## II NUMBERS (40 hrs.)

### Numbers upto 1000

- Using word problems/ contextual situations, reads, writes and compares 2, 3-digit numbers
- Estimating 2, 3- digit numbers on the number line
- Understands place value in 2, 3-digit numbers
- Expands a number using place value
- Makes numbers using given digits

### Addition and Subtraction

- Using word problems/ contextual situations for a additions and subtractions up to 999.(compare-combination and comparison types of word problems)
- Estimates sums and differences of 2, 3 digit numbers.
- Adds and subtracts 2-digit numbers on the empty number line.
- Frames word problems.

## Multiplication

- Using word problems/ contextual situations multiplies 1 & 2-digit numbers with 1 & 2-digit numbers using the standard (column) algorithm as well as the distributive law. (Array product - rate product and grouping types of word problems)
- Multiply with 10s and 100s
- Frames word problems
- Estimates products-  $2 \times 1$ ,  $2 \times 2$ ,  $3 \times 1$

## Division

- Using word problems/ contextual situations dividing 2 & 3-digit numbers by 1 & 2-digit numbers - with remainder and without remainder (using both equal grouping and sharing)
- Estimates quotients of 2 & 3-digit numbers divide by 1-digit numbers
- Frames word problems
- Explores the relationship between multiplication and division using 2 & 1-digit numbers

## Fractional numbers

- Identifies half, one fourth and three - fourths of a whole
- Identifies the symbols,  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{3}{4}$
- Explains the meaning of  $\frac{1}{2}$ ,  $\frac{1}{4}$  and  $\frac{3}{4}$
- Compares, adds and subtracts like fractions intuitively

## Patterns (3 hrs)

- Carries forward patters in numbers based on addition, subtraction, multiplication and division

## III Measurement (21 hrs)

### Length

- Identifies meter and centimeter lengths
- Relates meter with centimeter
- Converts meter into centimeter
- Measures length in meters, centimeters and inches
- Estimates length of an object and distance between two given locations
- Solves problems involving length and distances in meters and centimeters

### Weight

- Understands weight in terms of kilograms and grams using actual weights and created weights.
- Relates kilogram with gram
- Estimates the weight of an object and verifies it using a balance.
- Solves problems involving weight using kilograms and grams
- Appreciates the conservation of weight

## Capacity

- Understands capacity in terms of liter and milliliter
- Relates liter with ml
- Measures capacity of given liquid using containers marked with standard units.
- Estimates the capacity of a liquid .Verifies by measuring
- Solves problems involving capacity in liters and milliliters

## Time

- Appreciates the difference in time in terms of minutes, hours, days and months.
- Reads the calendar and identifies the days in the week, the weeks in the month, the months in the year
- Understands that the year in which February has an extra day is called leap year and that a leap year occurs once in every four years
- Can relate the date to the day on the calendar
- Reads clock time to the hours and minutes
- Solves problems

## IV Data Handling (6 hrs)

- Reading data using a pictograph
- Reading data using a box chart (bar graph)
- Recording data using tally marks

## Day to day maths (5 hrs) (Money, Length, Weight, Capacity, Space)

- Word problems/ contextual situations using more than one operation and/ or more than one concept and/or multiple stages of solving
- Estimation in daily life

## Academic Standards

*Academic standards are clear statements about what students must know and be able to do.  
The following are categories on the basis of which we lay down academic standards*

### **Problem Solving**

Using concepts and procedures to solve mathematical problems

#### **(a) Kinds of problems**

Problems can take various forms- puzzles, word problems, pictorial problems, procedural problems, reading data, tables, graphs etc.

#### **(b) Stages of problem solving**

- Reads problems
- Identifies all pieces of information/data
- Separates relevant pieces of information
- Understanding what concept is involved
- Selection of procedure
- Solving the problem

#### **(c) Complexity**

**The complexity of a problem depends on**

- Making connections( as defined in the connections section)
- Number of steps in the problem
- Number of operations in the problem
- The amount of context unraveling required in the problem
- Nature of procedures in the problem

### **Reasoning Proof**

- Reasoning between various steps (involves conjuncture invariably).
- Understanding and making mathematical generalizations and conjectures
- Understanding and justifying procedures
- Examining logical arguments.

- Understanding the notion of proof
- Using inductive and deductive logic
- Testing mathematical conjectures

### Communication

- Writing and reading mathematical expressions like  
 $3 + 4 = 7$   
 $\frac{3}{4}$
- Creating mathematical expressions
- Explaining mathematical ideas in his/her own words like- a square is closed figure having four equal sides and all equal angles
- Explaining mathematical procedures like- adding two digit numbers involves first adding the digits in the units place and then adding the digits at the tens place/ keeping in mind carry over.
- Explaining mathematical logic

### Connections

- Connecting concepts within a mathematical domain- for example relating adding to multiplication, parts of a whole to a ratio, to division. Patterns and symmetry, measurements and space
- Making connections with daily life
- Connecting mathematics to different subjects
- Connecting concepts of different mathematical domains like data handling and arithmetic or arithmetic and space
- Connecting concepts to multiple procedures

### Visualization and Representation

- Interprets and reads data in a table, number line, pictograph, bar graph, 2-D figures, 3-D figures, pictures
- Making tables, number line, pictograph, bar graph, pictures