17 | Trip to the Golkonda Fort
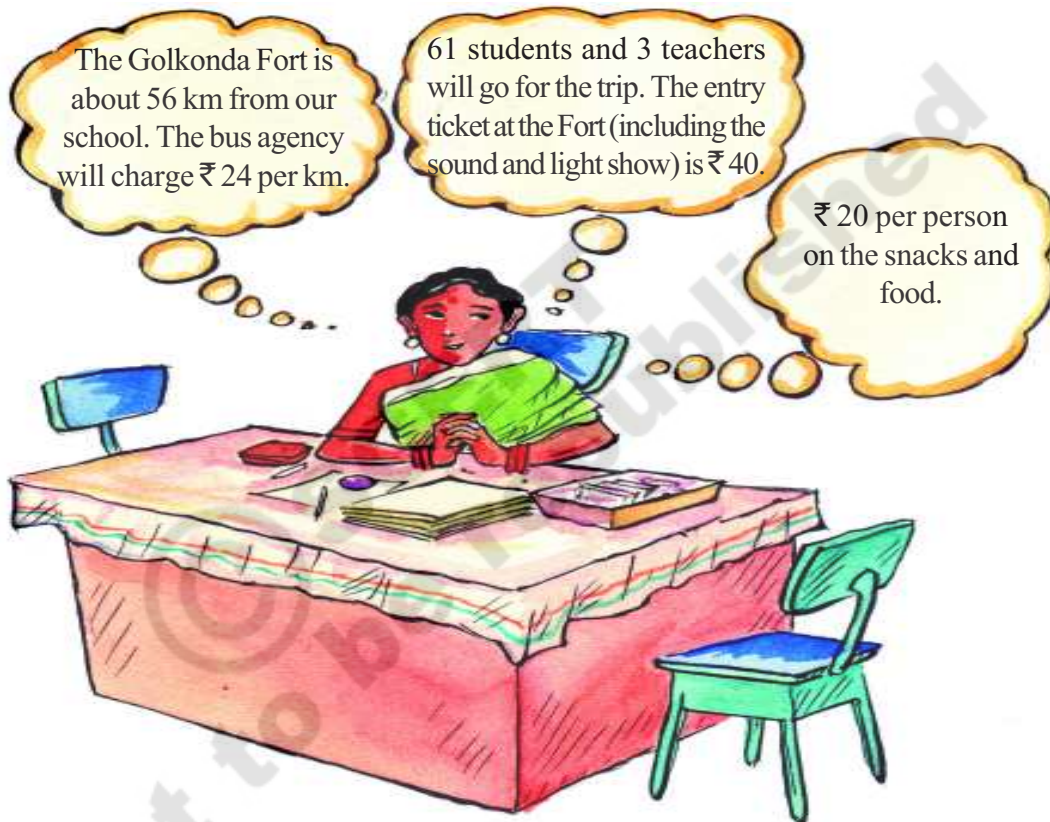
The teachers of Gummadidala Primary School are planning to take the children of class 4 and 5 to Golkonda Fort. The head teacher is estimating the expenditure for the trip.

The Golkonda Fort is about 56 km from our school. The bus agency will charge ₹ 24 per km.

61 students and 3 teachers will go for the trip. The entry ticket at the Fort (including the sound and light show) is ₹ 40.

₹ 20 per person on the snacks and food.

(a)   What is the total amount that will be due to the bus agency?

(b)   How much money is needed for the tickets at Golkonda Fort?

(c)   So cost per head will be

    (i)   travel cost   _____

    (ii)   ticket cost   _____

    (iii)   food cost   _____

    (iv)   total cost   _____

There might be some other smaller costs so let me ask each person to pay ₹ 110.

The day of the trip

The trip was planned for 10 /11/12

(a)   Write this date specifying the day, month and year? _____

Everybody gathered at school at 7 AM on the day. The bus arrived after 20 minutes. Everybody was seated in the bus within 15 minutes.

(b)   At what time did the bus arrive at school?

(c)   At what time did they start journey?

The driver stopped the bus at a petrol pump to fill fuel tank.

(a)   If the bus travels 5 km in one liter of diesel then how much diesel is needed for the trip?

(b)   If 1 liter of diesel costs ₹ 54 then how much will the bus driver has to pay at the petrol pump?

56 km to the fort and another 56 km back to school

At Golkonda Fort

On reaching the fort the children started looking interestly at the fort map near the entrance of the fort.

Oh! Look the map shows the top view of the fort.
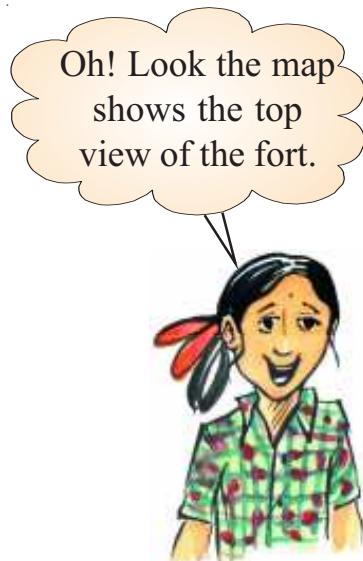
Teacher Radha explained the history of the Fort to the children- The Golkonda Fort is built on a 400 feet high stone hill. The fort has got its name from the Telugu words 'Golla Konda' meaning 'shephard's hill'. Legend has it that a shepherd boy had found an idol lying on the 'Mangalavaram' hill and told the king who had got a mud fort built around it in the year 1143. This fort was made bigger and stronger in the year 1500 and by 1590, the Golkonda fort had a strong 10 km long stone wall.

(a)   About how many years back was the mud fort built on the 'Mangalavaram' hill?

500   700   900

(b)   About how many years back were the walls of the fort built in stone?

700   600   500

(c)   Represent the following on the time line given below.

(i)   The year in which the mud fort was made.

(ii)   The century (100 years) in which the fort was made longer and stronger.

(iii)   The current year

(iv)   The year in which your father was born.

1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	

Kalpna teacher further explained the fort has various halls, temples, mosques, barracks for housing soldiers, prison cells, stables, gardens etc. When we have seen the fort I will ask you to show them to me on the map you are looking at right now.

The group then entered the fort through the Fateh Darwaza. The words Fateh Darwaza, mean 'the victory gate'.
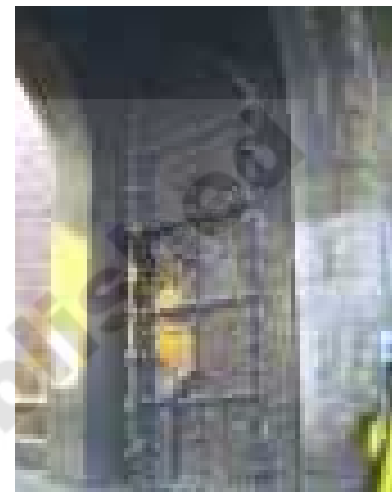
Manoj: This gate is so big.

Pallavi: It is so much bigger than any gate I have ever seen.

Teacher: Yes, it is 13 ft wide and 25 ft hight. It is made of teak wood which is studded with steel spikes, to protect the fort against enemy elephant charge.

(a)   How wide and high is your school gate?

(b)   About how many times more is the length of the fateh darwaza than your school gate?

(c)   About how many times more is the width of the fateh darwaza than your school gate?

One more thing is very special about this gate. If you clap or shout under its dome you can hear its sound at the Bala Hisar Pavilion which was the highest point of the fort and about one kilometer away. In the past this was used to serve as a warning in times of danger.

The group then started exploring the fort. They came across this box shaped piece of iron in one of the enclosures. Many children tried to lift it but none could. Their teacher also could not lift it.
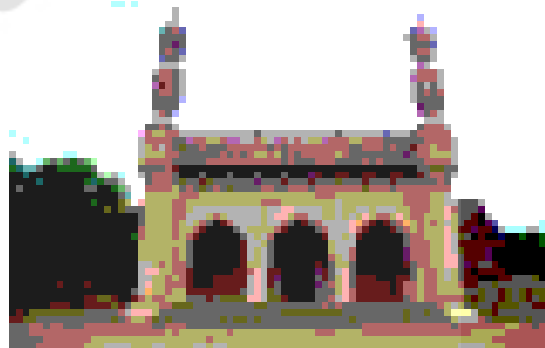

How much do you think the iron piece weighed?

This iron piece weighs 260 kg and was used to test soldiers' strength in the past.

(a)   If one child weighs 40 kg then the weight of how many such children is equal the weight of the iron piece?
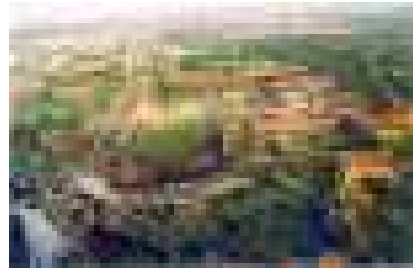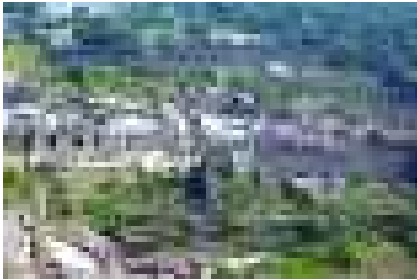
Then they came across this beautiful mosque.

The group then reached the Bala Hisar gate. The children counted 380 steps to the Balahisar pavilion where they could hear the sounds of claps at the Fateh darwaza.

When the children looked down at the city from Balahisar Pavilion the city looked like this-

Then the group went to see Nagina Bagh. The garden had various square and rectangular shaped grass court patches.

(a)   If a square shaped patch has a 2m side then, what is its perimeter?

(b)   If this patch is lined with bricks of length 25 cm each, then how many such bricks are needed to line the patch?

(c)   If there are 13 such patches then how many bricks are needed?

(d)   If the rectangular shaped patch is 3 m long and 1m 50 cm wide then, what is its perimeter?

(e)   If this patch is lined with bricks of length 25 cm, then how many such bricks are needed to line the patch?

(f)   If there are 19 such patches then how many bricks are needed?

The group went to various other interesting sites and came out of the fort by 2.30 PM.

On coming out of the fort, the children came across the fort map again.

(a) Teacher: Now children! can you identify the Bala Hisar Pavilion and the Mosque in the map.

The children were also looking at the fort walls with interest. The teacher explained the perimeter of the fort is about 10 km.

(b) Estimate the perimeter of your school boundary. About how many times more is the perimeter of the fort.

She further explained that the fort has 8 gates and 87 semi-circular bastions like these. In the past a certain number of soldiers used to be stationed in each bastion to protect the fort.

How many soldiers are needed to protect this fort

(c) If 9 soldiers are stationed at each bastion and 2 at each gate, then how many soldiers would be protecting the fort?

On their journey back, the group stopped at a restaurant to eat lunch and by the time they reached the school it was 5 pm.

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.

I SPATIAL UNDERSTANDING (16 hrs.)
Shapes and spatial understanding
- Identifies and reads floor maps routes/road maps
- Draws simple floor maps of familiar locations
- Identifies nets of cubes
- Uses shapes to create different shapes (tangram)
- Uses a dot sheet to make various 2D shapes
- Extends and makes tiling patterns
- Explores line symmetry in familiar 3-D objects expressed as 2 D shapes.
- Explores rotations of familiar 2-D shapes.
- Identifies angles in the environment
- Identifies right angles
- Identifies angles more than and less than right angles
- Draws right angle and angles more than and less than right angles.
- Identifies centre and radius of a circle.

Patterns (3 hrs.)
- Identifies, carries forward and makes visual patterns based on alternations and rotation
- Identifies the block or unit of the pattern

II NUMBERS (40 hrs.)
Numbers upto 10000
- Using word problems/ contextual situations, reads, writes and compares 3 & 4-digit numbers.
- Understands place value in 3, 4-digit numbers
- Expands a number using place value
- Makes numbers using 4 digits
- Skip counting in hundreds and thousands

Addition and Subtraction
- Using word problems/ contextual situations for a additions and subtractions up to 9999. (compare-combination and comparison types of word problems)
- Estimates sums and differences of 3, 4 digit numbers
- Frames word problems
- Appreciates the commutative property of addition
- Understands the relationship between addition and subtraction

Multiplication
- Using word problems/ contextual situations multiplies 2 & 3-digit numbers with 2-digit numbers using the standard (column) algorithm as well as the distributive law. (array product - rate product and grouping - Cartesian product types of word problems)
- Multiply with 10s, 100s, 1000s
- Frames word problems.
- Estimates products 3×1, 3×2

Division
- Using word problems/ contextual situations dividing 2-digit numbers by two digit numbers and three digit numbers by two digit numbers- with remainder and without remainder (using both equal grouping and sharing)
- Understands the patterns which emerge from division by 10

- Uses standard division algorithms for 2 & 3 digit numbers divided by one and two-digit numbers as well as 4 digit numbers by one digit numbers.
- Frames word problems.
- Even and odd numbers
- Tests of divisibility for 2, 5 & 10.
- Estimates quotients
- Explores the relationship between multiplication and division using 2 & 3-digit numbers

Fractional Numbers
- Finds the fractional part of a collection/ object
- Applies simple fractions to measurements
- Identifies equivalent fractions $\frac{1}{2}, \frac{2}{4}, \frac{3}{6}$ and $\frac{4}{8}$
- Compares like and unlike fractions (without LCM)
- Addition and subtraction of like fractions

Patterns (3 hrs.)
- Identifies patterns in square numbers, triangular numbers
- Identifies patterns in multiplication and division
- Numbers between consecutive square numbers
- Identifies the patterns in the multiples of 9

III MEASUREMENT (26 hrs.)

Length, Weight, Capacity
- Understands the meaning of a foot and relates feet to inches.
- Understands the meaning of quintal and its relationship with kilograms
- Converts kilometer to meter; meter to centimeter, liter to milliliter; kilogram to gram; quintal to kilogram
- Solves problems involving length, weight and capacity using all the above mentioned units
- Estimates length, weight, capacity
- Understands the concept of area
- Determines area intuitively
- Calculates perimeter

Time
- Appreciates the difference in time in terms of seconds, minutes, hours, days, months and years
- Converts hours into minutes and minutes into seconds
- Expresses time, using the terms, 'am' and 'pm'
- Understands 24 hour clock and conversion between 12 and 24 hour clocks
- Reads the date
- Appreciates movement of time in years

IV DATA HANDLING (6 hrs.)
- Reading a pictograph
- Understands the importance of an appropriate scale for pictograph
- Reading bar graphs
- Organizing data using tally marks

V DAY TO DAY MATH (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

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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

  $3 + 4 = 7$

  $\dfrac{3}{4}$

- 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