

There are three parts to each math class.

Part 1: The Math Circle time. (whole class)

Students of all levels are part of this circle.

Duration: Max 30 min

Part 2: Small Group: Students of level 1a, 1b, 1c and 1d are part of one group, students of levels 2a, 2b and 2c are part of another group, and 3rd small group is all the students of 3a, 3b and 3c

Duration: max 30 minutes

Part 3: Individual and self-paced work.

Students do the work in their individual sub level ie 1a, 1b, 1c, 1d, 2a, 2b, 2c, 3a, 3b, or 3c
Each sublevel will have 4-10 skills to be mastered with 3 components

1. Work with the teacher
2. Work with a peer
3. Work independently

Duration: 30 minutes to 45 minutes.

TOTAL: 90-120 minutes

PART 3: Individual and self-paced work

Level 1a

Objective:

Learn the number symbols from 0 to 9, their Kannada names (ಒಂದು, ಎರಡು, ಮೂರುetc) and the true meaning of each number. An ideal pacing would be something like this:

1. Numbers 1 to 5(1 week)
2. Then 0 to 5. (3 days)
3. Then consolidate - 0 to 9 (2 weeks)

Activities 1 to 5 (listed below) need to be done for numbers 1 to 5 for one week. Then 0 to 5 for 3 days. And Then 6 to 9 for one week. Then 0 to 9 for again one week.

So the students will work at least **3 weeks and 3 days** for the level 1a

1a	Activity	Process	Materials
FOR NUMBERS 0-5			
1	Color the squares	Teacher writes the numbers 1 to 5 on the left end of the page in math notebook and put as many as dots on the right side of the number. Students need to color the squares with TWO different colors in alternate squares. (use pencils instead of crayons)	
2	Cups with numbers and stones / Number cards and clips / Paper plate with number written on it.	Arrange cups from 1 to 5 on the floor. Teacher sits on the side of the student (not across). Show each cup and read the symbol and count and put as many as stones as the number indicates, one by one into each cup. Similarly use the other alternative items to count.	Cups with attached number cards
3	Trace the number symbol with clay and stones	Teachers writes the number symbol on the floor (better big in size). Students trace it using clay and then stones. Repeat it 2-3 times a session.	
4	Worksheet for number 1 to 9. (to be printed and filed)	Students color the picture and write the numbers in the worksheet.	Worksheets: 1a- 4.1 to 4.11
5	Write the numbers in notebook.	Teacher writes the numbers in the notebook and students copy them - 5 to 10 times at a time (not more than that)	

FOR NUMBERS 0-10			
6	Matching stones to numbers	Matching the number symbols to objects using card sets	Number and picture card sets
7	Coloring the squares (jumbled)	This will also serve as an assessment. Teacher writes the numbers on the left side of the page vertically (this time not in order but randomly and without the dots in the boxes). Child colours the corresponding number of squares for each number – alternately using two different colours.	
8	GROUP GAME	<p>A group of students 2-5 in numbers sit in a circle. The number cards are randomly kept on the floor face down in the centre.</p> <p>Students write the numbers 1 to 9 in their notebook from left to right.</p> <p>First student picks one of the cards and sees what is written on it. If the number is '1' all the students circle 1 in their notebook. If the card is not 1, the student keeps the card back and the next student opens up a new card and sees. After 1 is opened then 2 needs to be opened.</p> <p>When one of the student opens 2 then all of them circle 2 in their notebook and so on till all the numbers are circled by students in their notebooks.</p> <p>Then students arrange all the cards in order from 1 to 9 on the floor.</p> <p>It can be repeated thrice in a session. Sometimes with number cards and other times with picture cards.</p>	Number and picture cards with number symbols 1 to 9.
9	Work sheets for counting and writing practice.		Worksheets: 1a- 8.1 to 1a 8.11

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Level 1b

Objective:

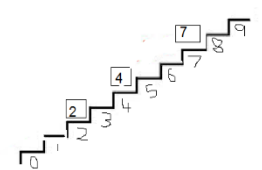
Understand the order of the number sequence till 9.

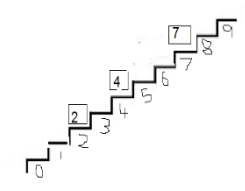
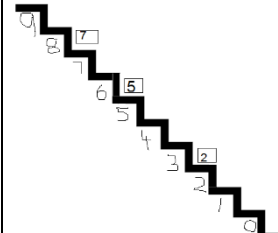
Compare numbers 0-9.

1b	Activity	Process	Materials
1	Ordering		
	Consolidate through worksheets		Worksheets from 1b 1.1 to 1b 1.5
2	Before , after, in between		
	STEP 1 TEACHER LED Introduction	<p>Teacher/ the student arranges number cards 1 to 9 on the floor from left to right.</p> <p>Touch one card (Eg 4). Ask the student “Which is this number?” Then ask them which number comes after 4 (idu aadamele - mundina sankhye) and show them number 5 and place it after 4. Teacher needs to pay extra attention to make it clear to the student that “mundina sankhye” means the number <u>after</u> (aadamele) or the next number. This is to avoid confusion for the student.</p> <p>In the same way the previous number or the number before (hindina sankhye) can also be introduced and discussed. (for some students the idea of previous number is too abstract to grasp at this stage). Even after several rounds of discussion, if the student is still struggling with the concept it can be discussed later after they complete future learning milestones.</p> <p>In addition this concept can be strengthened with more activities during Circle Time (Refer Game # xxx in GROUP ACTIVITIES document). These give the child a physical experience of the concept of forward and backward.</p> <p>In between number is quite intuitive for students.</p>	

		Teacher can take away a number from the cards kept on the floor. For example take away 5, and ask the student to show 4 and 6. And ask them which number is missing between 4 and 6. Multiple rounds of same activity can be done.	
	Consolidate through worksheets		Worksheets from 1b 2.1 to 1b 2.7
3	Greater than – less than		
a	STEP 1: TEACHER LED Crocodile story.	<p>Narrate story: <i>There once was a crocodile in a village and it was very hungry. There were two lakes in that village. Each pond has fish in it. (Teachers can use two plates as ponds and some counters as fish in each pond or draw two circles on the floor with chalk instead of the plates) The crocodile looks at the two ponds and wonders how many fish are there in the first pond. (Teacher can ask one of the students to count) Oh, there are 6 fish in this pond. Let me see how many fish are there in the second pond. (Teacher can ask one of the students to count). Oh here there are only 4 fish.</i></p> <p><i>Now our crocodile is very very hungry and she wants to eat lots of fish to satisfy her hunger. So which pond will she go to eat the fish? The one with 6 fish or the one with 4 fish? Since the crocodile is very hungry she will go to eat 6 fish. There are more (ಜಾಸ್ತಿ) fish here. 6 is a bigger number. (ದೊಡ್ಡ ಸಂಖ್ಯೆ)</i></p> <p>Keep the cut out in such a way that the open mouth faces the bigger number of counters. Repeat the activity several times. Once the activity is demonstrated by the teacher, students work in pairs or groups of 3. One student can fill the ponds with fish (less than 10 in each at this stage) and other students can place the crocodile mouth.</p>	<p>Two paper plates or circular discs. Crocodile's open mouth drawn as a cardboard cutout. Cards with fish and numbers on opposite sides</p>

		Introduce an example where the number of fish in each pond is the same. The word equal (ಸಮ) is introduced here.	
b	STEP 2 :INDEPENDENT Picture cards	<p>Students are given picture cards with small fish drawn on it. Keeps any two cards on the floor with some space in between. Student compares the cards and draws the less (ಚಿಕ್ಕ ಸಂಖ್ಯೆ) than or greater than (ದೊಡ್ಡ ಸಂಖ್ಯೆ) symbol or an = sign(ಸಮ ಸಂಖ್ಯೆ) between the two cards using chalk.</p> <p>Student copies the equation in her notebook. Eg $7 > 3 / 2 < 8 / 4 = 4$</p> <p>Key words: big, small equal. (ದೊಡ್ಡ/ಚಿಕ್ಕ/ ಸಮ ಸಂಖ್ಯೆ)</p> <p>Students need to work with at least 10 pairs of cards in a session and the same need to be copied to their notebook. You could use sets of cards with other objects as well – not necessarily fish.</p>	
c	STEP 3: INDEPENDENT Number cards	<p>Same activity as above. Instead of picture cards here student uses number cards.</p> <p>Equations are again copied in the notebook.</p>	
d	Consolidate through worksheets		Worksheets from 1b 3.1 to 1b 3.5
4	Ascending and Descending order		

<p>a</p>	<p>STEP 1 : TEACHER LED</p> <p>Ascending order.</p> <p>The Hungry rabbit and carrots.</p>	<p><i>Use the story of the rabbit and the carrots to explain the concept. Draw steps going up – left to right on the floor with chalk as shown.</i></p> <p><i>Narrate story: There was a rabbit in a forest and there were 3 carrot farms near the forest. The rabbit was hungry and went looking for carrots in each farm. (Carrot pictures depicting different numbers are placed in 3 circles far apart).</i></p> <p><i>The rabbit looked at each farm and counted how many carrots are there in each farm.(Teacher can ask students how many carrots are there in each and also ask about how many carrots each of them can eat in one go etc.)</i></p> <p><i>The rabbit is very small so he always starts eating from the place that has the smallest number of carrots.</i> <i>So here which farm has the least number of carrots? Let the students tell which one is lesser and give all of them an opportunity to say which among the 3 sets is the least in number. And keep the carrot card on the ladder corresponding to its number. (Act as if the rabbit ate the carrot).</i></p> <p><i>The rabbit is still hungry. Again he looks and wonders which is the lesser among the two remaining. Let the students tell which one is least and give all of them an opportunity to say which among the two remaining set is least in number. And keep the picture on the ladder corresponding to its number.</i></p> <p><i>The rabbit is still hungry and he is eating the last one which is the highest among the three set of carrots. (And keep the picture on the ladder corresponding to its number)</i></p> <p><i>Summarize: So this is the least number of carrots (call the number out loud), this is more than this then this is more....this way we go from less to</i></p>	<p>Cards with carrots and numbers on opposite sides</p> 
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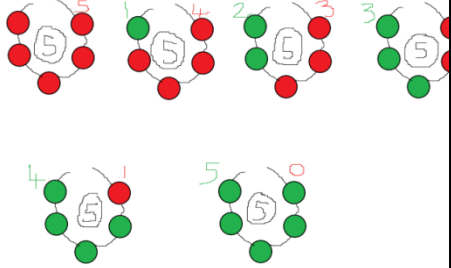
		<i>more. This is called ascending. (ಏರಿಕೆ ಕ್ರಮ)</i>	
b	<p>STEP 2 : INDEPENDENT</p> <p>Ascending order with number cards</p>	<p>Draw steps on the floor from 0-9 with a chalk. (left to right/ bottom to top)</p> <p>A pile of number cards are kept on the floor. Students take 3 cards from the pile and arrange them in ascending order on the drawn ladder. The same needs to be copied in their notebooks. Compare at least same 6 sets of (3) cards each in a session</p>	
c	<p>STEP 1 : TEACHER LED</p> <p>Descending order.</p> <p>The Hungry Elephant and sugarcane.</p>	<p>Similar story as the rabbit. Here elephant is big so starts eating from the BIG number.</p>	
d	<p>STEP 2 : INDEPENDENT</p> <p>Descending order with number cards</p>	<p>Draw steps on the floor from 9 to 0 with a chalk. (left to right/ top to bottom)</p> <p>A pile of number cards are kept on the floor. Students take 3 cards from the pile and arrange them in ascending order on the drawn ladder. The same needs to be copied in their notebooks. Compare at least 6 sets of (3)cards each in a session</p>	
e	<p>Consolidate through worksheets</p>		<p>Worksheets from 1b 4.1 to 1b 4.10</p>
f	<p>SUMMATIVE 1a-1b</p>		<p>Worksheet S1a-1b</p>

Level 1c

1c	Activity	Process	Materials
1	Addition (0-9)		
a	<p>STEP 1 : TEACHER LED</p> <p>Introduction</p> <p>Addition</p>	<p>Teacher sits with 2-4 students. Give Student A 4 stones and Student B 3 stones. <i>(Use it as an opportunity to assess by asking students how many stones they each have and see if all the students are able to count. Also compare the two numbers and ask which one is bigger – which one is smaller. If any student is unable to count or identify the big and small she needs to go back to level 1a or 1b)</i></p> <p>Demonstrate:</p> <p>Teacher: (To Student A): "How many stones are there with B?" (Check if the student gives the correct count)</p> <p>(To Student B): "How many stones are there with A?" (Again check if the student gives the correct count)</p> <p>"A, now can you please give all of your stones to B?" (A gives all of his stones to B)</p> <p>"How many stones are left with A now?" (Check if students are able to give the answer as zero)</p> <p>"And how many stones does B have in TOTAL (ಮೊತ್ತ/ ಒಟ್ಟು ಸೇರಿ) now?"</p> <p>(Students count and answer. If counting is wrong – count again)</p> <p>Teacher: "What have we done here?"</p>	


		<p>(Let the students describe what was done). <i>"We added (jodisu) 4 stones and 3 stones and we got 7 as total (motta)."</i></p> <p>While saying it teacher writes down the mathematical expression $4+3=7$. (And also explains the meaning of + as addition (jodisuvudu or sersisuvudu) and the meaning of = sign as whatever is there on either side of = sign is the same or equal (sama).</p> <p>Repeat it several times with different combinations of numbers. Write it down on the floor whenever they complete one addition. More importance is given to talking. Students need not write it down. Here make sure that the total is always less than 10.</p>	
b	Addition using picture cards.	<p>Picture cards are kept on floor separated by '+' sign and '=' sign is written at the right end. Students can count total number of flowers (for example) on each card, counts the total number and writes the answer after the '=' sign.</p> <p>Students can do 10-15 problems and the same can be written in their notebook.</p>	This activity can be done alone or in pairs.
c	Addition using number cards	<p>Same as above. Instead of picture cards, number cards are used.</p> <p>Students can continue to use stones or pebbles to do the operation, if they still need concrete visualisation</p>	This activity can be done alone or in pairs.

e	Consolidate through worksheets	Independent work with worksheets.	Worksheets 1c 1.1 to 1c 1.10
2	Subtraction (within 10)		
a	Introduction	<p>Teacher sits with 2-4 students. Student A is given 8 stones (<i>use it as an opportunity to assess by asking students how many stones are there with the student and check if all the 4 students are able to count.</i>)</p> <p>Demonstrate: “A, can you please give 3 stones to B? (Another student).” After A gives 3 stones to B, teacher asks again “How many stones are LEFT (<i>baaki/ulithu</i>) with A now? Allow the students to arrive at the answer 5.</p> <p>Teacher can write down the mathematical expression $8-3=5$ on the floor with a chalk. Explain the meaning of ‘-’ (minus) sign as <i>taking away</i> (<i>kaLiyuvudu</i>) and subtracting. Repeat it several times till the students get an idea of the operation. More importance is given to talking. Students need not write it down.</p>	
b	Subtraction using number cards.	Number cards are kept on the floor separated by ‘-’ sign and ‘=’ sign is written at the right end. Students can do 10-15 problems and the same can be written in their notebook.	
c	Consolidate through worksheets	Independent work with worksheets.	10 Worksheets 1C 2.1 to 1C 2.10

3	Decomposition		
a	Introduction	<p>Students are asked to draw a 'necklace (sara) with 5 beads in it. Ask them to color all the beads with red color. Now ask them if they want to change the color of one bead to something else. (Consult with students to decide what the new color should be).</p> <p>Draw one more sara with 5 beads and now change the color of first bead to green and the rest can remain red color. Write 1 near the green bead and write 4 near the red beads. Now say "If we join "1 and 4 we get 5". Draw one more 'sara' with two green beads and 3 red beads. Say 'if we join 2 and 3, we get 5'. Repeat this till all the beads are colored green.</p> <p>Draw and write as shown below.</p> 	
b	Consolidate through worksheets	Reinforce through worksheets for making 5, 7 and 9	Worksheets from 1c 3.1 to 1c 3.6
4	Consolidate mixed addition and subtraction problems with 3 numbers (mishrakriye) through worksheets		Worksheets from 1c 4.1 to 1c 4.6
b	SUMMATIVE 1a-1c		Worksheet S1s-1c







Level 1d

1d	Concept	Process	Materials
1	Place Value (ಹತ್ತು - ಬಿಡಿ)		
a	STEP 1 : TEACHER LED Concept of 10	<p>Students are given a pile of ice-cream sticks. They are asked to count. Pick one stick and say <i>ondhu</i>, pick one more and say <i>eredu</i> and continue till 9 sticks are in hand (<i>ombattu</i>).</p> <p>When the student picks the 10th stick, teacher says "<i>Hatthu</i>" loudly and lets all the students say it. And then asks the students to tie the 10 sticks using a rubber band and make a bundle. Students can continue making the bundles of 10 and keeping in front of them. Teacher asks how many bundles of 10s they have made and how many are left. Students can repeat this activity several times.</p> <p>Teacher can introduce the word "<i>hatthu</i>"(ಹತ್ತು) for the bundle and "<i>bidi</i>" (ಬಿಡಿ) for the loose ones.</p> <p>In the end when students finish creating the bundles, teacher asks "<i>How many hatthus do you have</i>" and "<i>How many bidis do you have</i>"?</p>	Ice Cream sticks with rubber bands
b	Number cards 0-10	Teacher keeps the number cards on the floor from 1 to 10. (top to bottom). Students keep corresponding number of sticks near each number card. When it reaches 10, they make a bundle of 10 sticks and keep it. (Refer to the picture).	Number cards 1 to 10 Ice cream sticks

		<p>Students later need to copy the same in their notebook</p> <p>1 —</p> <p>2 — —</p> <p>3 — — —</p> <p>4 — — — —</p> <p>5 — — — — —</p> <p>6 — — — — — —</p> <p>7 — — — — — — —</p> <p>8 — — — — — — — —</p> <p>9 — — — — — — — —</p> <p>10 </p>	
c	Extend Numbers 10 to 20	<p>Student similarly deconstructs numbers 10 to 20.</p> <p>Students make the numbers using the sticks on the floor and then they copy it to their notebook. Teachers need to repeatedly ask “How many ‘hatthu’ and how many ‘bidi’ are there in each number?”</p>	Number cards 10 to 20

d	Consolidate through worksheets		Worksheets from 1d 1.1 to 1d 1.13
2	Reinforcing 1-20		

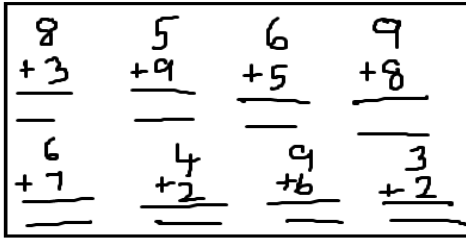
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		<p>Students can play this game in groups of 4.</p> <p style="text-align: center;">ಶಿಕ್ಷಕರ ಕಾರ್ಡ್</p> <table border="1" style="margin: auto;"> <tr> <td style="text-align: center;"></td> <td style="text-align: center;"></td> <td style="text-align: center;">13</td> <td style="text-align: center;">15</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">16</td> <td style="text-align: center;">11</td> <td style="text-align: center;">19</td> </tr> <tr> <td style="text-align: center;">10</td> <td style="text-align: center;">17</td> <td style="text-align: center;">12</td> <td style="text-align: center;">14</td> </tr> </table> <p style="text-align: center;">ಆಶ - ಆಟ</p> <p>ಆಟ ಆಡುವ ಕ್ರಮ</p> <ul style="list-style-type: none"> ★ ಈ ಆಟದಲ್ಲಿ 2 ರೀತಿಯ ಕಾರ್ಡ್‌ಗಳಿರುತ್ತವೆ. ಮೊದಲನೇ ಕಾರ್ಡ್ ಶಿಕ್ಷಕರ ಕಾರ್ಡ್ ನಂತರದ 4 ಕಾರ್ಡ್ ಮಕ್ಕಳ ಕಾರ್ಡ್‌ಗಳು. ★ ಈ ಹಂತಕ್ಕೆ ಬಂದ ಮಕ್ಕಳಿಗೆ, ಮಕ್ಕಳ ಕಾರ್ಡ್‌ಗಳನ್ನು ನೀಡಿ ಅಲ್ಲಿರುವ ಅಂಕಗಳ ಸಂಖ್ಯೆಗಳಿಗೆ ಅನುಗುಣವಾಗಿ ಕಲ್ಲು/ಬೀಡಿ/ಮಣಿಗಳನ್ನು ನೀಡುವುದು. ★ ಶಿಕ್ಷಕ/ಗಳೆಯ ಶಿಕ್ಷಕರ ಕಾರ್ಡ್‌ನಲ್ಲಿರುವ ಅಂಕಗಳನ್ನು ಅಡ್ಡಸಾಲಿನಲ್ಲಿ ಕ್ರಮವಾಗಿ ಹೇಳುವುದು. ★ ಶಿಕ್ಷಕ/ಗಳೆಯ ಹೇಳಿದ ಅಂಕಿಯನ್ನು ಆಲಿಸಿದ ಮಕ್ಕಳು ತಮ್ಮ ಕಾರ್ಡ್‌ನಲ್ಲಿನ ಅಂಕಿಯ ಮೇಲೆ ಬೀಜವನ್ನು ಇಡುವುದು. ★ ಕಾರ್ಡ್‌ನಲ್ಲಿನ ಎಲ್ಲಾ ಅಂಕಗಳ ಮೇಲೆ ಕಲ್ಲು/ಬೀಜಗಳನ್ನು ಮೊದಲು ಇಟ್ಟ ಮಗು ಆಟದಲ್ಲಿ ಗೆದ್ದಂತೆ. ★ ಗೆದ್ದ ಮಕ್ಕಳನ್ನು ವೈಶಿಷ್ಟ್ಯಿಸುವುದು ಮತ್ತು ತಪ್ಪಾಗಿದ್ದಲ್ಲಿ ಕಾರಣ ತಿಳಿದು ಸುಧಾರಣೆಗಾಗಿ ಪರಿಹಾರ ಕ್ರಮ ಕೈಗೊಳ್ಳುವುದು. 			13	15	18	16	11	19	10	17	12	14	
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3	Before, after ,in between														

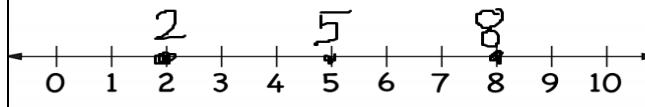
a		<p>Pick one card from the pile of number cards (from 1 to 20) place the card on the floor and write and before and after numbers. Repeat it for at least 10 cards and then copy it to the notebook.</p> <p style="text-align: center;"> 9 <input type="text" value="10"/> 11 14 <input type="text" value="15"/> 15 10 <input type="text" value="11"/> 12 16 <input type="text" value="17"/> 18 4 <input type="text" value="5"/> 6 </p>	
b	Consolidate through worksheets	Reinforce through worksheets for missing numbers	Worksheets from 1d 3.1 to 1d 3.4
4	Greater than – less than		
a	Big or small with number cards (1 to 20)	Use number cards and compare two cards at a time and draw the bigger than smaller than or equal sign between them (recollect the crocodile mouth story, if necessary)	Number cards, chalk

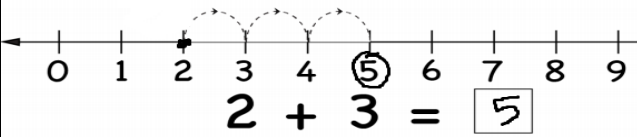
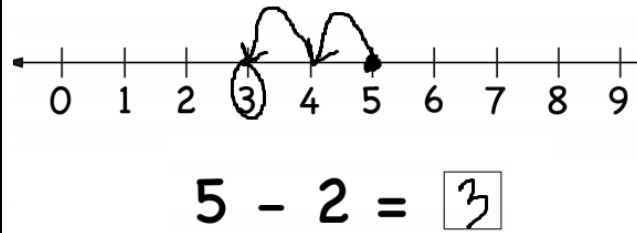
		<p>Once the activity is done on the floor, students copy it in their notebooks.</p>	
b	Consolidate through worksheets	Reinforce through worksheets for big or small number	Worksheets from 1d 4.1 to 1d 4.5
5	Ascending and Descending order		
a	Ascending order for number 1 to 20.	3 cards to be picked from a stack of cards (from 1 to 20) and arranged in ascending order. And then copy it to the notebook.	
b	Descending order for number 1 to 20	3 cards to be picked from a stack of cards (from 1 to 20) and arrange them in ascending order. And then copy it to the notebook.	
c	Consolidate through worksheets	Reinforce through worksheets for big or small number	Worksheets from 1d 5.1 to 1d 5.8
6	Addition (0-20)		
a	Addition	Use number cards from 1 to 9 and add any two at a time and write the answer on the floor using a chalk. Do at least 10 sums at a time and then copy it to the notebook. (Students shall use sticks or stones to solve the problem if they want to)	






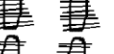
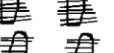

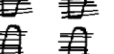
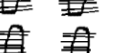
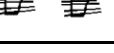
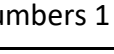
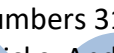
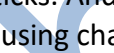
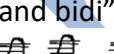









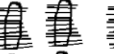








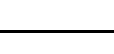
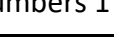




		$\boxed{5} + \boxed{3} = 8$ $\boxed{9} + \boxed{5} = 14$ $\boxed{7} + \boxed{6} = 13$ $\boxed{8} + \boxed{3} = 11$	
b	Consolidate through worksheets	Reinforce through worksheets for addition	Worksheets from 1d 6.1 to 1d 6.12
7	Subtraction (0-20)		
a	Subtraction	<p>Subtract any number from a bigger number within 20. Pick two number cards from the pile of cards from 1 to 20. Subtract the smaller number from the bigger number. After writing it on the floor, copy it to the notebook. (Students shall use sticks or stones to solve the problem if they want to)</p> $\boxed{8} - \boxed{3} = 5$ $\boxed{15} - \boxed{3} = 12$ $\boxed{12} - \boxed{9} = 3$ $\boxed{18} - \boxed{5} = 13$	
b	Consolidate through worksheets	Reinforce through worksheets for subtraction	Worksheets from 1d 7.1 to 1d 7.8

8	Consolidate – addition – subtraction –mixed problems (mishrakriye)		Laminated problem cards and worksheets from 1d 8.1 to 1d 8.9
9	Decomposition		
a		Use worksheets to practice decomposition	Worksheets 1d 9.1 to 1d 9.8
	SUMMATIVE 1a-1b-1c-1d		Worksheet S1a – 1d

Level 2a

2a	Concept	Process	Materials
1	Number line (1-10)		
a	Introduction	<p>Students mark different numbers on the number line. Use the laminated number lines. Teacher reads the number and students marks the respective numbers on the number line. Students can do this activity in pairs once the teacher is sure that they are able to do it by themselves.</p> <p>Once they are comfortable using the laminated number line they can start drawing the number line and marking the numbers in their notebooks.</p> <p>REMEMBER : Number line always starts with</p> 	
b	Addition using number line	Number line is to be drawn in the notebook	

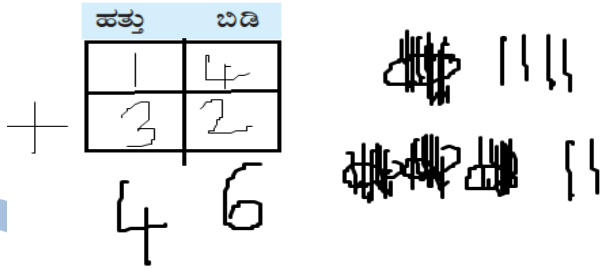
		 <p>and do addition as shown below. (Recollect the jumping on number line activity they did in Level 1) Teacher to say that “addition is MOVING FORWARD”</p>	
c	Consolidate through worksheets	Reinforce through worksheets for addition using number line	Worksheets from 2a 1.1 to 2a 1.6
d	Subtraction using number line.	Number Line is to be drawn in the notebook and do subtraction as shown below. Teacher is to say that “Subtraction is MOVING BACKWARD”	
			
e	Consolidate through worksheets	Reinforce through worksheets for addition using number line	6 Worksheets from 2A1.7 to 2A1.12
2	Place Value (1-50)		
a	Numbers 21 to 30	Make numbers 21 to 30 on floor using ice cream sticks. And the numbers can be written on floor using chalk. Teacher asks how many “hatthu and bidi” are there in each number.	

		<p>20  </p> <p>21   —</p> <p>22   — —</p> <p>23   — — —</p> <p>24   — — — —</p> <p>25   — — — — —</p> <p>26   — — — — —</p> <p>27   — — — — —</p> <p>28   — — — — —</p> <p>29   — — — — —</p> <p>30   </p>	
b	Writing Numbers 1 to 30	Write numbers 1 to 30 in the notebook.	
c	Numbers 31 to 40	<p>Make numbers 31 to 40 on floor using ice cream sticks. And the numbers can be written on floor using chalk. Teacher asks how many “hatthu and bidi” are there in each number.</p> <p>30   </p> <p>31    —</p> <p>32    — —</p> <p>33    — — —</p> <p>34    — — — —</p> <p>35  — — — — —</p> <p>36 — — — — —</p> <p>37 — — — — —</p> <p>38 — — — — —</p> <p>39 — — — — —</p> <p>40 </p>	
d	Writing Numbers 1 to 40	Write numbers 1 to 40 in the notebook.	

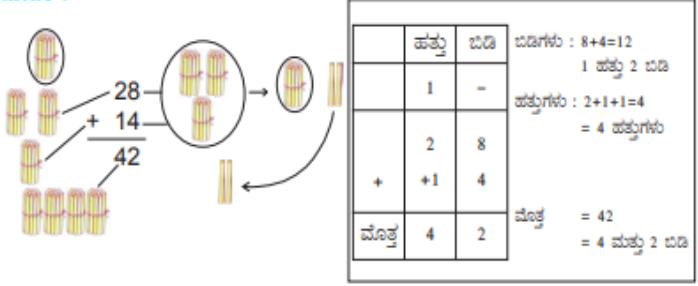
e	Numbers 41 to 50	<p>Make numbers 41 to 50 on floor using ice cream sticks. And the numbers can be written on floor using chalk. Teacher shall ask how many “HATHU and BIDI are there in each number.</p>	
f	Consolidate through worksheets	Reinforce through worksheets for place value 1-50	Worksheets from 2a 2.1 to 2a 2.4
3	Before, after number (1-50)		
	Consolidate through worksheets	Worksheets for practicing before, after and in between of numbers from 1 to 50	Worksheets from 2a 3.1 to 2a 3.4
4	Greater than – less than (1-50)		
	Consolidate through worksheets	Worksheets for practicing bigger or smaller numbers from 1 to 50	Worksheets from 2a 4.1 to 2a 4.4
5	Ascending and Descending order (1-50)		
a	Consolidate through worksheets	Worksheets to practice ascending and descending order of numbers from 1 to 50	Worksheets from 2a 5.1 to 2a 5.4
6	Extending numbers (50-100)		
a	Numbers 51 to 70	Same steps as for numbers from 1 to 50	
b	Numbers 71 to 100	Same steps as for numbers from 1 to 50	

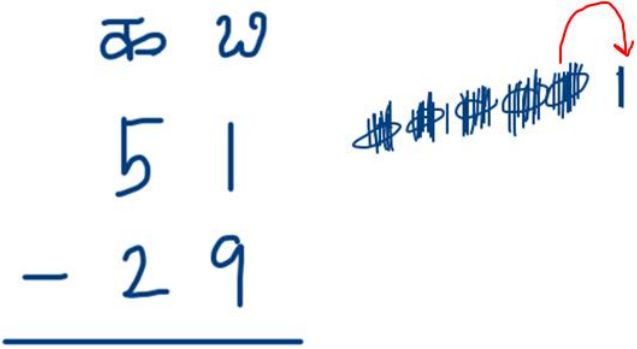
c	Repeat all concepts for 1-100 <i>Before after, in between</i> <i>Greater than –less than</i> <i>Ascending –Descending</i> <i>orders</i>	Worksheets to practice missing numbers, before and after, greater than or less than, ascending -descending order of numbers 1-100	Worksheets from 2a 6.1 to 2a 6.12
	SUMMATIVE 1a- 2a		Worksheet S1a -2a

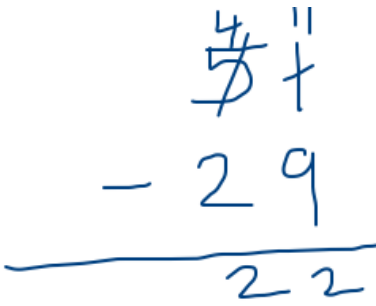

Level 2b

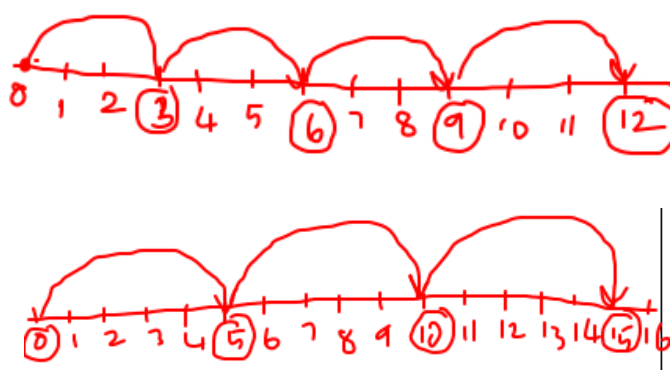
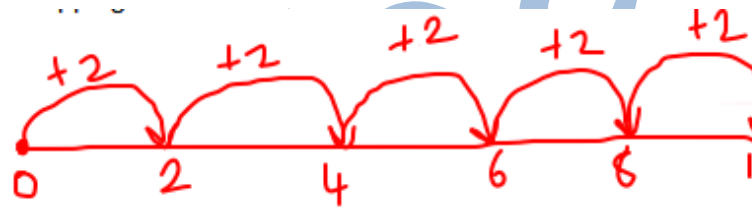
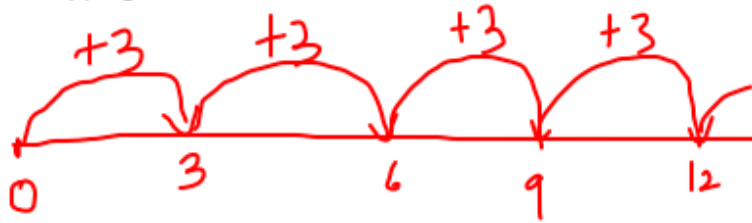
2b	Activity	Process	Materials
1	Addition of two digit numbers without regrouping (without carryover)		
a	INTRODUCTION Adding two digit numbers	 <p>Tell a story. Eg: Ayesha has 14 chocolates and Ravi has 32 chocolates. If Ravi gives all his chocolates to Ayesha, how many chocolates does Ravi have now? How many chocolates does Ayesha have?</p> <p>Ask one of the students to pick 14 ice cream sticks and another student to pick 32 ice cream sticks. Ask "How many hatthu and bidi are there in your hand?"</p> <p>Depict the problem as in mathematical language:</p>	

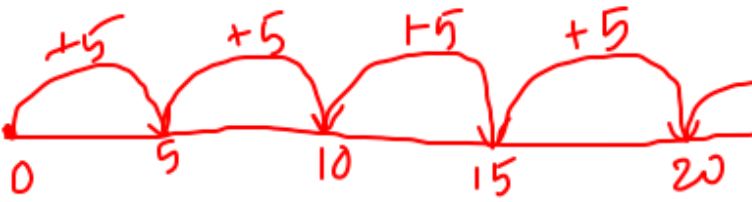
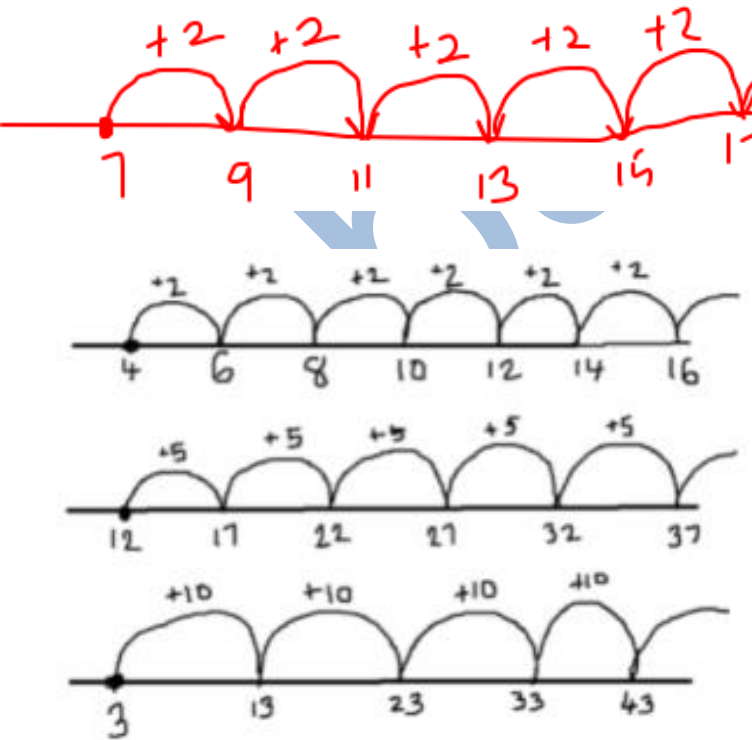
		<p>Write on the floor as shown and keep the sticks. Count all the bidi first (6). Write the number (6). Then count all the hattu bundles. Write 4 beside 6. Now read the whole number – 46. (nalavattharu). That is the sum.</p> <p>Repeat this several times with practical problems from life. Each time, the student has to represent the numbers as sticks then numbers and then writes the total sum as shown above.</p> <p>Student copies the same problems in their notebooks.</p>	
b	Consolidate through worksheets	<p>Students solve problems independently using sticks. Use problem cards or worksheets available in the class.</p> <p>Next step – students do problems without sticks</p>	Laminated problem cards and Worksheets 2b 1.1 to 2b 1.8
2	Subtraction of two digit numbers without regrouping (without borrowing)		
a	INTRODUCTION Subtracting two digit numbers	<p>Tell a story: <i>Ravi has 47 chocolates and he wants to give away 24 chocolates to his friend, Ashok. How many chocolates will be left with Ravi after he gives 24 chocolates to Ashok?</i></p> <p>Ask one of the students to pick 47 ice cream sticks.</p> <p>Ask “How many hatthu and bidi are there?”</p> <p>“How many chocolates are to be given to Ashok?” (Response:24)</p> <p>Ask: <i>How many hatthu and bidi are there in 24? So we need to take away 24 from 47.</i></p> <p><i>We will start with bidis. 4 bidis are to be taken away from 7 bidis. Is it possible? (yes)</i></p> <p><i>How many bidis are remaining? (3)</i></p> <p><i>Then take away 2 hatthus . How many hatthus are remaining? (2)</i></p>	


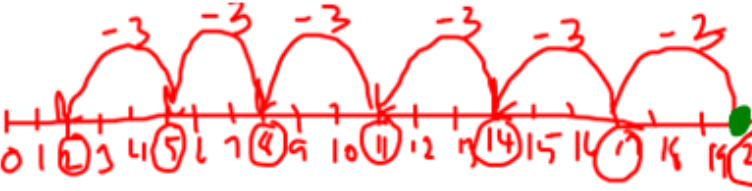
		So when we took away 24 from 47 we got 23 as remaining. Repeat this several times with different questions.																					
b	Consolidate through worksheets	Students can solve problems independently using sticks. Use problem cards or worksheets available in the class. Next step – students do problems without sticks	Laminated problem cards and Worksheets 2b 2.1 to 2b 2.8																				
3	Addition with regrouping																						
a	INTRODUCTION Addition by regrouping	<p>ಉದ್ದೇಶ : 1 ರಿಂದ 50 ರ ವರೆಗಿನ ಸಂಖ್ಯೆಗಳನ್ನು ಬಳಸಿ (ಮೊತ್ತ 50 ಕ್ಕೆ ಮೀರದಂತೆ) ದಶಕ ರಹಿತ ಸಂಕಲನ ಮಾಡುವುದು.</p> <p>ಸಾಮಗ್ರಿ : ಹತ್ತರ ಕಡ್ಡಿ ಕಟ್ಟುಗಳು, ಬಿಡಿ ಕಡ್ಡಿಗಳು 1 ರಿಂದ 50 ರವರೆಗಿನ ಮಿಂಚುಪಟ್ಟಿಗಳು.</p> <p>ಕಲಿಸುವ ಕ್ರಮ :</p> <p>ಮಾದರಿ :</p>  <table border="1" data-bbox="779 903 1128 1186"> <tr> <td></td> <td>ಹತ್ತು</td> <td>ಬಿಡಿ</td> <td>ಬಿಡಿಗಳು : 8+4=12 1 ಹತ್ತು 2 ಬಿಡಿ</td> </tr> <tr> <td></td> <td>1</td> <td>-</td> <td>ಹತ್ತುಗಳು : 2+1+1=4 = 4 ಹತ್ತುಗಳು</td> </tr> <tr> <td></td> <td>2</td> <td>8</td> <td></td> </tr> <tr> <td>+</td> <td>+1</td> <td>4</td> <td></td> </tr> <tr> <td>ಮೊತ್ತ</td> <td>4</td> <td>2</td> <td>ಮೊತ್ತ = 42 = 4 ಮತ್ತು 2 ಬಿಡಿ</td> </tr> </table> <p>ಹಂತ 1 : ಮೊದಲು ಬಿಡಿ ಕಡ್ಡಿಗಳಿಗೆ ಬಿಡಿ ಕಡ್ಡಿಗಳನ್ನು ಕೂಡಿಸಿದಾಗ ಬರುವ ಹನ್ನೆರಡು ಕಡ್ಡಿಗಳಲ್ಲಿ ಕಟ್ಟುಹಾಕಿ ಒಂದು ಹತ್ತರ ಕಟ್ಟು ಮಾಡುವುದು, ಉಳಿದ ಎರಡು ಬಿಡಿ ಕಡ್ಡಿಗಳನ್ನು ಸೂಚಿಸುವ ಅಂಕಿಯನ್ನು ಮೊತ್ತದಲ್ಲಿ ಸ್ಥಾನಕ್ಕನುಗುಣವಾಗಿ ಬರೆಯುವುದು.</p> <p>ಹಂತ 2 : ಹತ್ತರ ಕಟ್ಟುಗಳನ್ನು ಕೂಡಿಸುವಾಗ, ಬಿಡಿ ಕಡ್ಡಿಗಳನ್ನು ಕೂಡಿದಾಗ ಬಂದ ಹತ್ತರ ಕಟ್ಟನ್ನೂ ಕೂಡಿಸಿಕೊಂಡು ಕೊಡಬೇಕು. ಬಂದ ಮೊತ್ತವನ್ನು ಸ್ಥಾನಕ್ಕನುಗುಣವಾಗಿ ಮೊತ್ತದಲ್ಲಿ ಬರೆಯುವುದು.</p> <p>ಸೂಚನೆ : ಎರಡು ಸ್ಥಾನಗಳ ದಶಕ ಸಹಿತ ಸಂಕಲನದಲ್ಲಿ ಬಿಡಿ ಸ್ಥಾನದಲ್ಲಿನ ಅಂಕಗಳನ್ನು ಕೂಡಿದಾಗ ಬಂದ ಮೊತ್ತವು 10 ಅಥವಾ ಅದಕ್ಕಿಂತ ಹೆಚ್ಚಾದಾಗ ಆ ಸಂಖ್ಯೆಯ ಬಿಡಿಸ್ಥಾನವನ್ನು ಮೊತ್ತ (ಒಟ್ಟು) ದಲ್ಲಿ ಬರೆದು ಹತ್ತರ ಸ್ಥಾನದ ಅಂಕಿಯನ್ನು ಹತ್ತರ ಸ್ಥಾನಕ್ಕೆ ವರ್ಗಾಯಿಸಿ, ಅನಂತರ ಆ ಹತ್ತನ್ನು ಸೇರಿಸಿಕೊಂಡು ಹತ್ತುಗಳನ್ನು ಕೂಡಿಸಿ ಬಂದ ಮೊತ್ತವನ್ನು ಸ್ಥಾನಕ್ಕನುಗುಣವಾಗಿ ಬರೆಯುವುದನ್ನು ಹಲವು ಚಟುವಟಿಕೆಗಳ ಮೂಲಕ ಪುನರಾವರ್ತಿತ ಮನದಟ್ಟು ಮಾಡಿಸುವುದು.</p> <p>ಶಿಕ್ಷಕರ ಗಮನಕ್ಕೆ : ಶಿಕ್ಷಕರು ಈ ಹಂತಕ್ಕೆ ಬಂದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಹಲವು ಲೆಕ್ಕಗಳನ್ನು ನೋಟ್‌ಪುಸ್ತಕದಲ್ಲಿ ಮಾಡಿಸಿ ಕಲಿಕಾಂಶದ ಸಂಪೂರ್ಣ ಮನವರಿಕೆ ಮಾಡಿಸಿದ ನಂತರವೇ ಅಭ್ಯಾಸ ಚಟುವಟಿಕೆಯಲ್ಲಿ ತೊಡಗಿಸುವುದು.</p>		ಹತ್ತು	ಬಿಡಿ	ಬಿಡಿಗಳು : 8+4=12 1 ಹತ್ತು 2 ಬಿಡಿ		1	-	ಹತ್ತುಗಳು : 2+1+1=4 = 4 ಹತ್ತುಗಳು		2	8		+	+1	4		ಮೊತ್ತ	4	2	ಮೊತ್ತ = 42 = 4 ಮತ್ತು 2 ಬಿಡಿ	
	ಹತ್ತು	ಬಿಡಿ	ಬಿಡಿಗಳು : 8+4=12 1 ಹತ್ತು 2 ಬಿಡಿ																				
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+	+1	4																					
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b	Consolidate through worksheets	Students can solve problems independently first using sticks. Use problem cards or worksheets available in the class.	Worksheets 2b 3.1 to 2b 3.8																				

		Then move to without using sticks.	
4	Subtraction with regrouping.		
a	INTRODUCTION Subtracting by regrouping	<p>Let us try to subtract 29 from 51 using sticks.</p> <p>51 – 29 Write the problem on the floor as shown here.</p>  <p>Ask the students to put the 5 groups of 10 (hatthugalu) on the “5”, the 1 single on the “1”,</p> <p>We need to take away 29 from 51. We need to start from bidigalu.</p> <p>Ask them if they can take 9 bidikalu away from the 1 bidi. No, of course not. Tell them that you need to “regroup” the hatthugalu sticks so that you can take away the 9. Take one of the group from the 5 hathugalu , undo the elastic band and put the 10 sticks with the 1 so you now have 11. Can we take 9 from 11 now? Yes. What is remaining once you take away 9 sticks? 2 right? Put the “2” in the “Bidi” column . Now we have to take way 2 hathugalu from 4 hathugalu. Point to the fact that now we have only 4 hathugalu with us after regrouping one.</p> <p>So you take away 2 hathugalu from 4 hathugalu and you are left with 2 Hathugalu. Have them count the answer and tell you what number is remaining after the subtraction is done.</p>	

		<p>On the floor or whiteboard, show them how you cross off the “51” and write ‘4 and 11’ above it so students can see you “regrouped” the “51” into ‘4 groups of 10 and 11’ which still add up to ‘51’. They can see how they got ‘2’ when they took away the 9 from the 11, and then they can see how they got ‘2 groups of 10’ when they took ‘2 groups of 10’ away from the ‘4 groups of 10’ which was regrouped into ‘4 groups of 10 and 11’.</p> 	
b	Consolidate through worksheets	<p>Students can solve problems independently using the sticks. Use problem cards or worksheets available in the class.</p> <p>Then move to without using sticks.</p>	Worksheets from 2b 4.1 to 2b 4.8
5	Skip jumping – forward (0 -100)		
a	<p>INTRODUCTION</p> <p>Skipping forward - Part 1 (starting from zero)</p>	<ol style="list-style-type: none"> 1. Create a number line in a notebook or on a board or floor (at least 0 to 20). Let the students also draw it in their books or on the floor. 2. Mark the number zero on the number line 3. Tell the student: <i>Let’s skip jump on the number line. Let’s skip 2 first.</i> Draw an arrow from 0 to 2 and then 2 to 4 and then from 4 to 6 and so on till the end of the number line. 4. Mark those numbers with a circle. 	

		<p>4. Repeat it for skips of 3 and 5.</p> 	
<p>b</p>	<p>Skipping forward - Part 2 (starting from zero)</p>	<p>This time we will not write all the numbers on the number line. We will only mark out 0 at the beginning of the number line. And we will jump 2 at a time. You can look in the previous work if you have doubt on which number to come next.</p> <p>1) Skip 2's</p>  <p>2) Skip 3's</p>  <p>3) Skip 5's</p>	

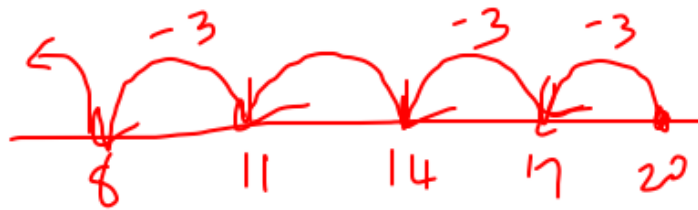
		 <p>Go as much as the students want to go. Writing the number line on the floor will be best for them to work on.</p>	
c	<p>Skipping forward - Part 3 (starting from any number)</p>	<p>At this level students are encouraged to start their number line from any number of their choice. For example, a number line starting from 7 and then doing skip jumping in 2's will look like this:</p>  <p>Students can try any number of their choice. Like it was done earlier, let students write and explore as much as they want. (writing the number line on the floor will be the best option)</p>	

d	Consolidate through worksheets	Worksheets to familiarize skip jumping	Worksheets from 2b 5.1 to 2b 5.4
6	Skip jumping – backward (0 - 100)		
a	Introduction – Skipping backward Part 1 (starting from zero)	<p>Draw a number line 0- 20. Mark the number 20 on it. Say: <i>Let's go backwards from 20 jumping 2 at a time.</i> Mention again that going backward is equivalent to subtraction. <i>That is, when we are going backward we are subtracting 2.</i></p>  <p>This one ends at zero</p> <p>Now try the same with skipping 3 at a time and then 5 at a time, starting from 20(you can even try starting from 30 or beyond if we draw the number line on the floor)</p> 	
b	Skipping backward - Part 2 (starting from twenty)	<p>This time we will not write all the numbers on the number line. We will only mark 20 at the end of the number line. And we will jump backward 2 at a time. You can look in the previous work if you have doubt on which number to come next.</p>	

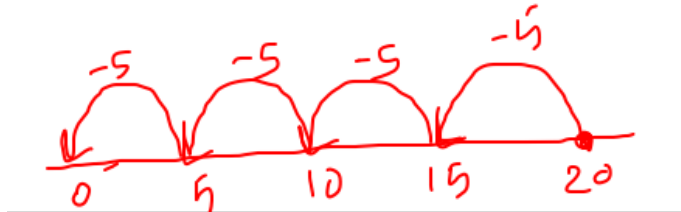
1. Skip 2's



2. Skip 3's



3. Skip 5's



You can start from 30 also.



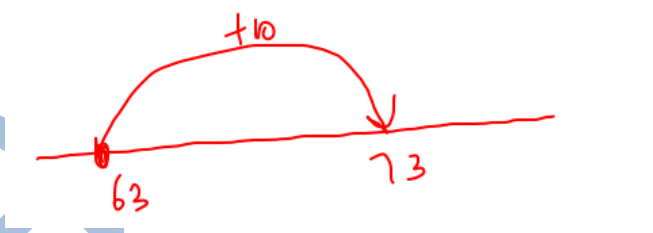
c	<p>Skipping backward - Part 3 (starting from any number)</p>	<p>Start from any number on the number line and continue going backwards, in intervals of 2 ,3, 5 or 10.</p> <p>See the example. Students can use ganitmala if they are finding it difficult to conceptualise. The starting point can be of students' choice. In the examples below the starting numbers are 53,36 and 95</p> <p>Use the floor to draw the number line and let students explore it. It is important to spend time on this. Ask questions like <i>how many jumps did you make to reach 23 from 53 - when you jumped 2 at a time?</i></p>	
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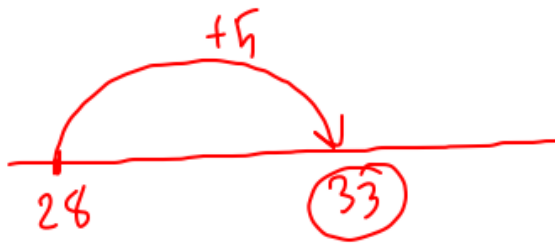
d	Consolidate through worksheets	Worksheets to familiarize skip jumping	Worksheets from 2b 6.1 to 2b 6.4

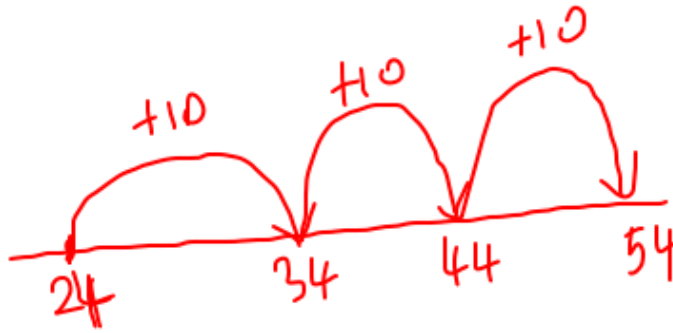
Level 2c

2c	Activity	Process	Materials
1	Addition using number line (two digit)		
a	Introduction Adding 10 to any number on a number line	Adding 10 to any number on a number line Here teacher shows the student how to add 10 to a number using a number line(Students are already familiar with skip jumping as an operation. This can be considered as a reinforcement of the same) 3+10 We are at 3 and then we will go 10 steps forward (that is, a jump which is equal to 10 steps)	



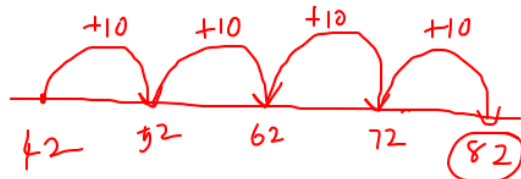
		<p>That means $3+10 = 13$. If any student is struggling with it, help her learn it by jumping one number at a time as shown below</p>  <p>Once she is comfortable with this do the direct jump of 10 in one shot.</p> <p>More examples are below.</p> <p>$25+10= 35$</p>  <p>$63+10=73$</p> 	
<p>b</p>	<p>Adding a one digit number to any number using number line.</p>	<p>This is to practice problems where a single digit is added to any number of student's choice.</p> <p>In the beginning students do it by jumping one at a time if she wants, like the example below. $28+5$ In order to solve this problem we start at 28 and then move 5 steps forward</p>	

		 <p>So $28 + 5 = 33$. Let the students do some practice of similar problems.</p> <p>Then encourage them to do it in a single jump by calculating the result in their minds (if the students have mastered the additin facts, this will be easier to them)</p> <p>28+5</p>  <p>Do many similar problems of adding 10 and adding one digit to any number of their choice for a couple of sessions.</p>	
c	<p>Adding a 10, 20, 30, 40, 50, 60.....to any number using a number line.</p>	<p>Once the students are comfortable adding 10 and asingle digit to a number using number line, adding multiples of 10 can be introduced</p> <p>For example 24 + 30</p> <p>In this problem we are starting at 24 and then moving 30 steps forward. This can be thought as jumping 10 steps thrice.Because 30 has 3 hatthu (tens) in it.</p>	



Another example

$42 + 40$



So $42 + 40 = 82$

Once students are comfortable doing it in their mind, they can even jump 40 at a time as shown below. (only after they are comfortable with this idea)



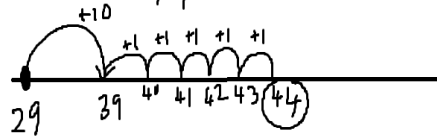
d Adding any number to any number using number line

Here we will use all the learning we had from last 3 steps.

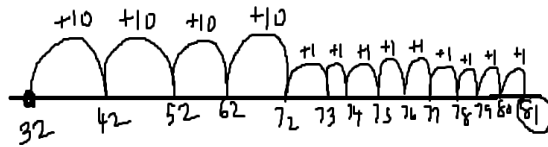
Examples as below.

When the student wants to move 10s and units at a time.

$$29 + 15 = 44$$

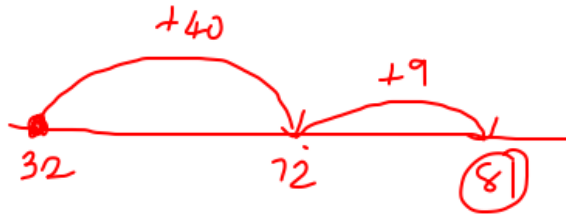


$$32 + 49 = 81$$



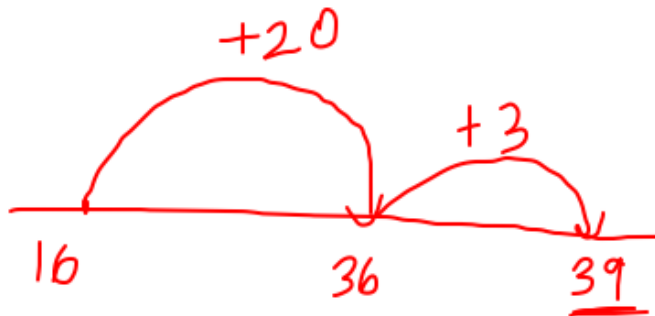
When the students are comfortable jumping all the tens in one shot and all the ones in one shot.

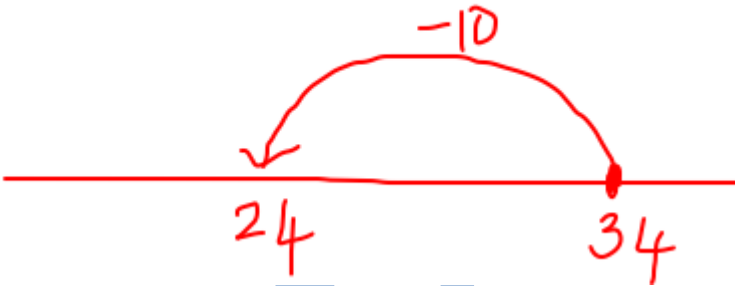
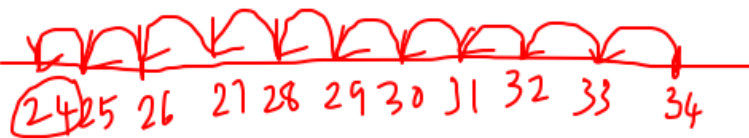
$$32 + 49$$

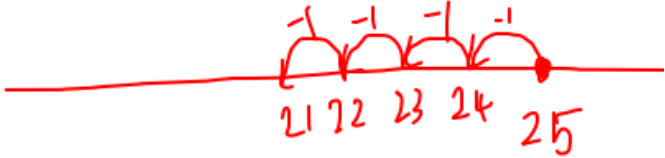
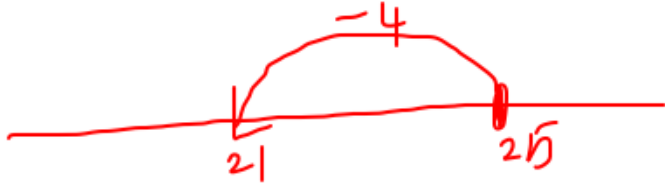
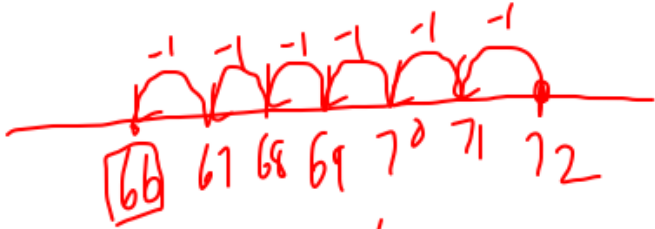
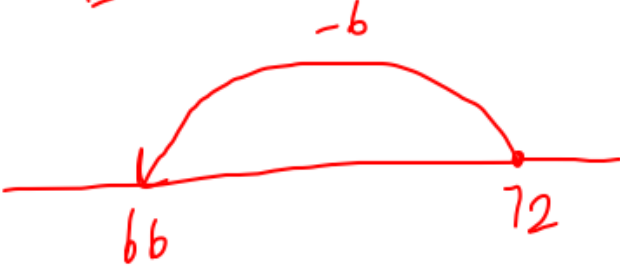


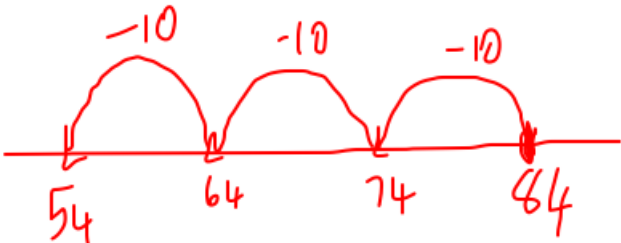
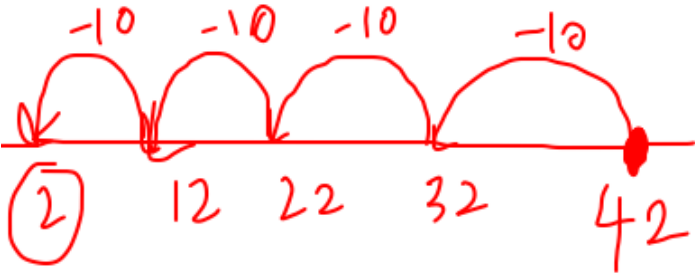
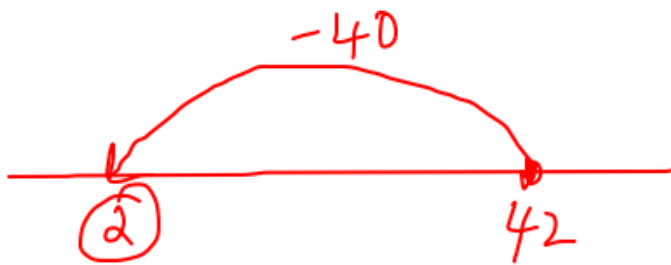
$$32 + 49 = 81$$

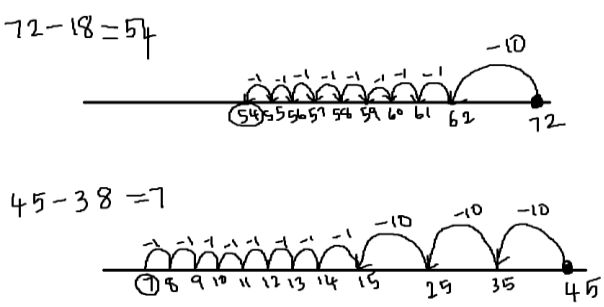
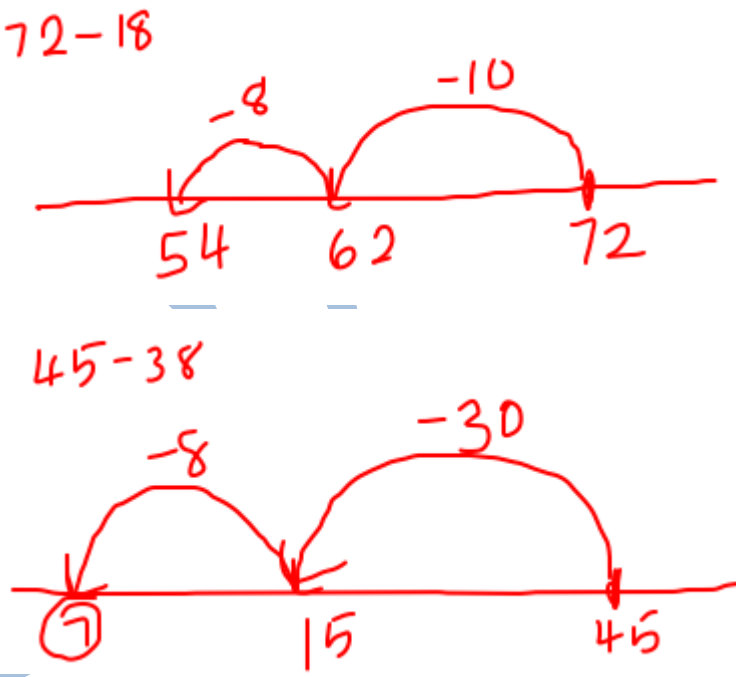
$$16 + 23$$

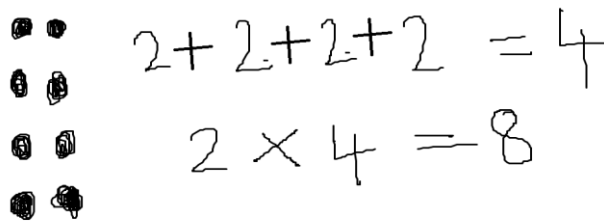



e	Independent	Worksheets to practise addition using number line	Worksheets 2c 1.1 to 2c 1.6
2	Subtraction using number line.		
a	<p>INTRODUCTION</p> <p>Subtracting 10 from any number on a number line</p>	<p>Similar to adding 10</p> <p>We will draw an open number line and decide a number 10 or greater than 10 to be subtracted from.</p> <p>For example let's subtract 10 from 34. It can be like this</p>  <p>We mark the number 34 at the right end of the open number line. Since it is subtraction, we move backward from 34 by 10. So we will reach 24. If a student has trouble doing it in one shot, let her do it by doing 10 small steps as shown below and later move to as shown above.</p>  <p>(This is required only if the student is not able to the subtract as shown in the first example.)</p>	

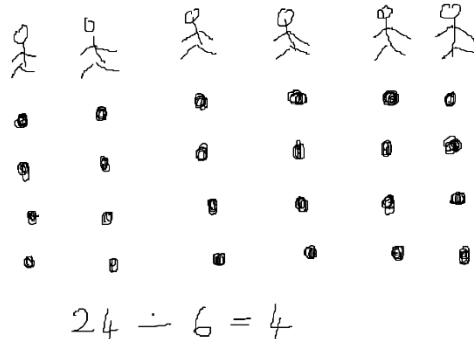
<p>b</p>	<p>Subtracting a single digit number from any number</p>	<p>Similar to addition.</p> <p>Examples are as shown below</p> <p>25-4</p>  <p>If the students are comfortable doing the subtraction in one shot, they can do that also as shown below.</p>  <p>72-6</p> <p>We can either go backward 6 times one step each or we can go backward once 6 units. Both ways are fine. Students should be able to do it one shot after some practice, that's our objective.</p> <p>72-6 = 66</p>  	
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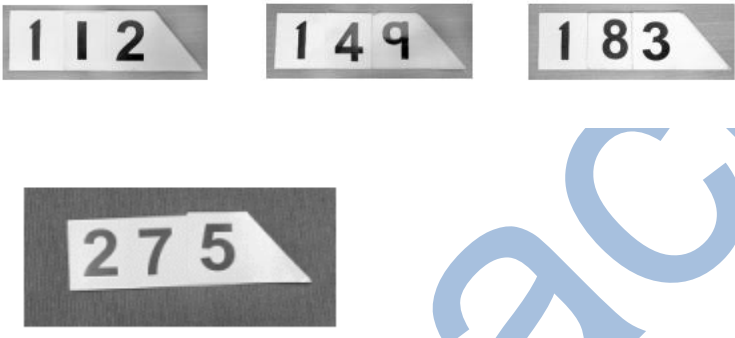
<p>c</p>	<p>Subtracting 10, 20, 30, 40, 50, 6....from any number using number line.</p>	<p>Once the students are comfortable subtracting 10 and a single digit to a number using number line, subtracting multiples of 10 can be introduced</p> <p>For example 84 - 30</p> <p>In this problem we are starting at 84 and then moving 30 steps backward. This can be thought as jumping 10 steps thrice. Because 30 has 3 hatthu in it.</p>  <p>Another example 42 - 40</p>  <p>Once students are comfortable doing it in their mind, they can jump 40 at a time as shown below. (only after they are comfortable with this idea)</p> 	
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<p>d</p>	<p>Subtracting any number from any number using number line</p>	<p>We will combine all the learnings from the previous 3 steps to do this.</p>  <p>When the students are comfortable jumping all the tens in one shot and all the ones in one shot. They should be able to work it out as shown below</p> 	
<p>e</p>	<p>Consolidate through worksheets</p>	<p>Worksheets to practise SUBtraction using number line</p>	<p>Worksheets 2c 2.1 to 2c 2.6</p>
<p>3</p>	<p>Multiplication</p>		
<p>a</p>	<p>INTRODUCTION</p>	<p>Learning Multiplication as repeated addition.</p>	

		<p>Teacher asks questions like: Example 1 <i>Lakshmi went to the shop and bought some chocolates. Each chocolate costs 2 rupees. What is the total cost if she bought 4 chocolates?</i></p> <p>Teacher first uses stones to demonstrate how it is calculated.</p>  <p>$2+2+2+2=8$ $2 \times 4 = 8$</p> <p>$2+2+2+2 = 2 \times 4 = 8$</p> <p>The multiplication sign can be introduced here. <u>Repeatedly say that 2×4 means 2 is added 4 times.</u></p> <p>Teacher can ask more questions and encourage students to ask questions of similar kind. This can be done with a group of 4-5 students.</p>	
b	Independent practice	<p>Solving multiplication problems using the idea of repeated addition. Students can choose to solve multiplication problems of their choice.</p> <p>Note: Due to the usage of Kannada language 3×4 means 3 is added four times (and not the other way round) So we will be following this language throughout and at some point we will teach students that we can consider 3×4 as 3 is added 4 times or 4 is added three times.</p>	Worksheets 2c 3.1 to 2c 3.4
4	Creating multiplication tables.	<p>Using the concept of <i>repeated addition</i>, students can create multiplication tables of numbers from 2 to 10. Students can use stones for this if they need.</p>	Note: It is important for students to understand multiplication as <u>repeated addition</u> and then they need to create the multiplication table. Only

		$2 \times 1 = 2 = 2$ $2 \times 2 = 2 + 2 = 4$ $2 \times 3 = 2 + 2 + 2 = 6$ $2 \times 4 = 2 + 2 + 2 + 2 = 8$ $2 \times 5 = 2 + 2 + 2 + 2 + 2 = 10$ $2 \times 6 = 2 + 2 + 2 + 2 + 2 + 2 = 12$ $2 \times 7 = 2 + 2 + 2 + 2 + 2 + 2 + 2 = 14$ $2 \times 8 = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16$ $2 \times 9 = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 18$ $2 \times 10 = 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 20$ <p>Once they create the multiplication table, students can be encouraged to learn the multiplication table 'by heart'.</p>	<p>after these two levels should they progress to learning the tables 'by heart' – that is, by rote.</p>
5	Division.	<p>Division is introduced as <i>equal distribution</i>.</p> <p>Teacher can start the conversation among 4-5 students. Teacher can bring some chocolates or pebbles and ask one of the students to distribute it equally among all of them.</p> <p>Example: <i>There are 5 students and 15 pebbles.</i></p> <p>The student may use any strategy to distribute the pebbles. She may distribute one pebble at a time to each one or she may distribute 3 pebbles at a time to each student.</p> <p>Once the student has distributed the pebbles correctly the teacher draws stick figures and uses stones as chocolates to show the whole operation.</p> <p>Introduce the sign for division also here.</p>  $15 \div 5 = 3$	

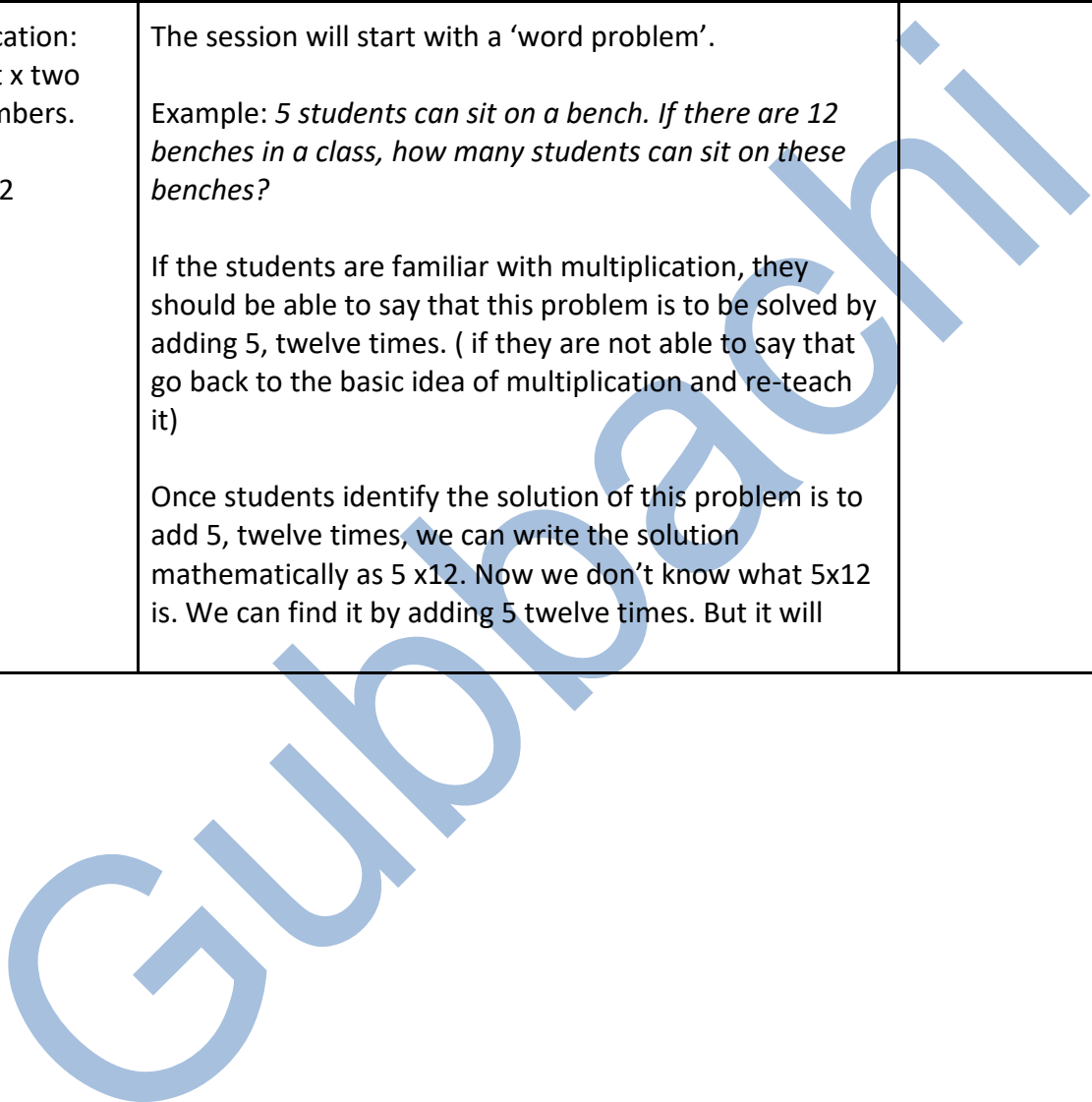
		<p>Teacher asks other questions of similar kinds. Eg: <i>There are 24 chocolates and is to be divided equally among 6 children. How many chocolates does each child get?</i></p> <p>Teacher draws stick figures on the floor. Use different colored counters or pebbles as chocolates and distribute them among the “people” (stick figures drawn on the floor) and see how many chocolates are there with each person?</p> 	
6	100s		
a	INTRODUCTION	<p>Students are given a bunch of ice-cream sticks more than 100 in number. Then ask them to make bundles of tens (hatthu). Once they make it, there will be more than 10 hatthu bundles and some bidi.</p> <p>Let us imagine a situation where they arrived at 13 hatthu and 6 bidi. <i>Reinforce the idea that whenever we have a 10 we group them into one.</i></p> <p>So here we have 13 hatthu. From this we can group 10 hatthu into one single group. Use a rubber band to keep these 10 hatthu bundles together and tell the students that 10 hatthu is called ondunooru (one hundred). So here we have 1 nooru, 3 hatthu and 6 bidi.</p> <p>Simultaneously show them the place value cards and create 136 using it. Repeat the idea that 136 has one 100 and one 30 and one 6. Or in other words 136 has 1 nooru, 3 hatthu and 6 bidi.</p> <p>So: Ondunooranalakku (One hundred and four)</p>	Ice cream sticks. Place value cards.

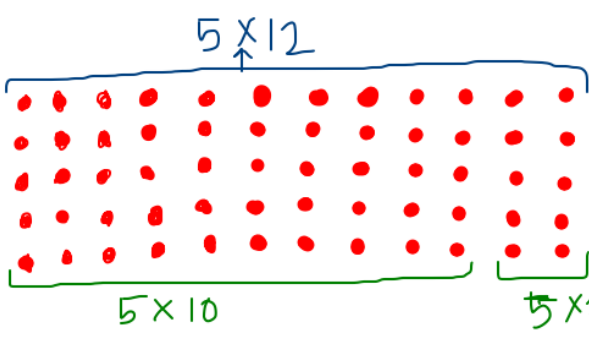
			
b	Numbers from 100 to 500.	Let students explore numbers from 100 to 200 using place value cards. And allow students to split the numbers into nooru - hatthu- bidis. 	Worksheets 2c 6.1 to 2c 6.8

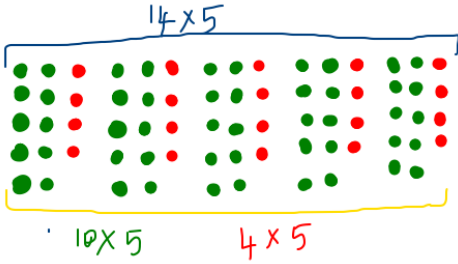
Level 3a

3a	Activity	Process	Materials
1	All operations with numbers 1-500		
a	Addition of numbers till 500.	Using place value system and using number line(as it was done for two digit numbers	Worksheets 3a 1.1 to 3a 1.5
b	Subtraction of numbers till 500.	Using place value system and using number line(as it was done for two digit numbers	Worksheets 3a 1.6 to 3a 1.10
c	Before - after		Worksheets 3a 1.11 to 3a 1.13
d	Greater than – less than		Worksheets 3a 1.14 to 3a 1.16

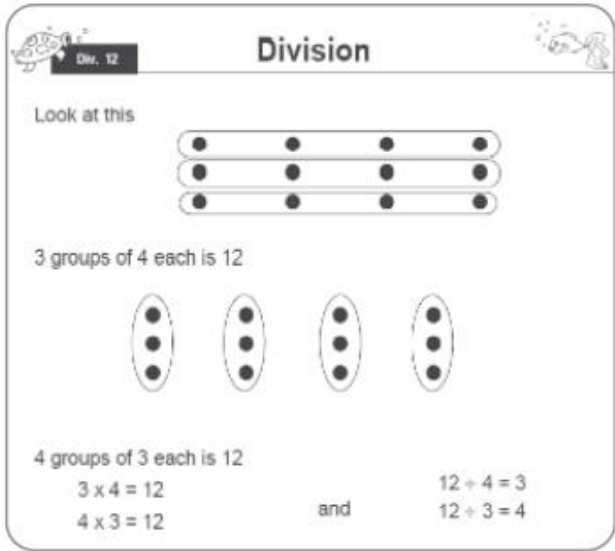
e	Ascending - descending		Worksheets 3a 1.17 to 3a1.19
2	MULTIPLICATION 2 digit numbers by splitting the number		
a	Multiplication: one digit x two digit numbers. Eg: 5 X 12	<p>The session will start with a 'word problem'.</p> <p>Example: <i>5 students can sit on a bench. If there are 12 benches in a class, how many students can sit on these benches?</i></p> <p>If the students are familiar with multiplication, they should be able to say that this problem is to be solved by adding 5, twelve times. (if they are not able to say that go back to the basic idea of multiplication and re-teach it)</p> <p>Once students identify the solution of this problem is to add 5, twelve times, we can write the solution mathematically as 5 x12. Now we don't know what 5x12 is. We can find it by adding 5 twelve times. But it will</p>	



		<p>again take some time.</p> <p>Let's create an image of this problems (5x12)</p> <p>When we look at this we can identify that 5 x 12 can be split into two parts 5x10 and 5x2. Both 5x10 and 5x2 we already know since we created the multiplication table and memorized it.</p>  <p>SO I can write $5 \times 12 = 5 \times 10 + 5 \times 2 = 50 + 10 = 60$.</p> <p>Do a couple of more questions like this, till they are comfortable with the new concept.</p> <p>Then encourage students to come up with their own word problems and solve the problems with the same logic.</p> <p>Then make the questions a bit more complex. For example:</p> <p>6 x 42 we can decompose (or split) as:</p> <p>$6 \times 10 + 6 \times 10 + 6 \times 10 + 6 \times 10 + 6 \times 2 = 60 + 60 + 60 + 60 + 12 = 242$)</p> <p>There is a need to do as many problems like this as possible to strengthen the concept.</p>	
b	<p>Multiplication: two digits x one digit numbers.</p> <p>Eg: 14 x 5</p>	<p>Again, start the conversation with a word problems. Eg: <i>One notebook costs 14 rupees. If we buy 5 notebooks, what will be the cost of it?</i></p> <p>So students will be able to say that we need to do 14 x 5.</p>	


		<p>Once we establish that that's what we need to do, we can draw a visual representation of it. The situation is such that 14 need to be added 5 times.</p>  <p>If you pay attention we can see it as 10 x 5 and 4 x 5. So $14 \times 5 = 10 \times 5 + 4 \times 5 = 50 + 20 = 70$.</p> <p>So this kind of questions can also be decomposed (split) and solved.</p> <p>$32 \times 4 = 10 \times 4 + 10 \times 4 + 10 \times 4 + 2 \times 4 = 40 + 40 + 40 + 8 = 128$ Make diagrams as much as possible.</p>	
c	Independent	Worksheets to do one digit by two digit and 2 digit by one digit multiplications	Worksheets 3b 2.1 to 3b 2.14

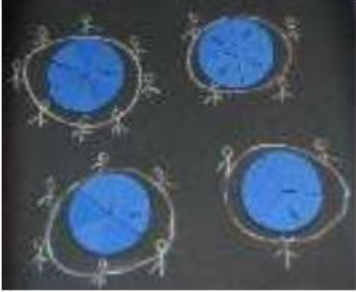

Level 3b

2c	Activity	Process	Materials
1.	Relationship between division and multiplication.	<p>It is quite possible that children may intuitively use multiplication facts to arrive at the answers for division problems. In fact, children who have internalised multiplication concepts quite thoroughly may straight away use multiplication facts by converting the division problem into complementary multiplication problem. Example: $12 \div 4$ may be converted to: "4 times which number equals 12?"</p> <p>However, not all children may see the connection. Hence it becomes necessary for the teacher to lead the children into this discovery by asking directed questions.</p> <div data-bbox="506 682 1117 1228" style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p style="text-align: center;">Division</p> <p>Div. 12</p> <p>Look at this</p>  </div> <p>How many square pieces did you have at the start? 12. Into how many rows are you going to distribute the 4. How many pieces have you placed in each row? 3 pieces. How do we state this as a division fact?</p> $12 \div 4 = 3.$ <p>Can you describe this arrangement (as shown in the picture) as a multiplication situation?</p> $3 \times 4 = 12.$	
b	Independent	Creating division problems from multiplication problems and vice versa	Worksheets 3c 1.1 to 3c 1.3
2.	Division between two digit and one digit numbers. the division algorithm –	<i>Share 48 biscuits among 4 friends.</i>	

	without remainder	<p>This is shown as $4 \overline{) 48}$</p> $\begin{array}{r} \text{t} \quad \text{u} \\ 1 \\ 4 \overline{) 48} \\ - 4 \\ \hline 0 \quad 8 \end{array}$ <p>Share out tens first Each gets 1 ten 4 tens are given out altogether</p> <p>8 units to be given out</p> $\begin{array}{r} \text{t} \quad \text{u} \\ 1 \quad 2 \\ 4 \overline{) 48} \\ - 4 \\ \hline 0 \quad 8 \\ - \quad 8 \\ \hline 0 \end{array}$ <p>Each gets 2 units 8 units are given out altogether</p> <p>Activate Windows Go to Settings to activate Wi</p> <p>We start with ‘tens’. It is important to point out to students that we start from the tens position. Ask the question how many tens (At each point, read the number with its place value to draw the student’s attention to it). <i>Can we share it equally amongst 4 people?</i></p> <p>Each one gets 1 ten (emphasize the place value again). This is recorded in the division problem as 1 ten in the tens place over 4. It is important to emphasize the place value all the way through.</p> <p>Now as we subtract 4 tens given away, we move to second step. Many children take time to learn two step division problem; hence we should go very slowly, articulating every action.</p> <p>We can even use a downward arrow to indicate ‘<i>bringing down the next number</i>’. This focuses the child’s attention on it, makes him understand what is happening and serves as a visual aid.</p> <p>We now take down 8 units and each gets 2 units which is then recorded on top of 8 as quotient. After subtraction there are no units left. <i>So there is no remainder.</i></p>	
b	Independent		Worksheets 3b 2.1 to 3b 2.5
3	Division between two digit and one digit numbers. And Mastering	<p><i>Share 64 rupees among 4 people</i></p> <p>We will start the conversation with the idea that we need to start from the tens. So we have 6 tens and it</p>	

	<p>the division algorithm – with remainder</p>	<p>needs to be divided between 4 people. <i>So how many tens, one person will get?</i></p> <p>One person will get one ten. SO we will write it above 6 at the tens position. Now we have distributed 4 tens, we subtract it from 6 tens we have 2 tens remaining, we have 4 units also to distribute so we bring it down with 2 tens. So now, we have 24 rupees to be divided between 4 people. If we check the multiplication table of 4, we can identify that 24 by 4 is 6. So we write it on the top 4 at the units place. We subtract 24 from 24 and have nothing as remainder.</p> $ \begin{array}{r} 16 \\ 4 \overline{) 64} \\ \underline{4 } \\ 24 \\ \underline{24} \\ 0 \end{array} $ <p>In the same way we can discuss the division <i>with remainder</i> as the example shown below.</p> $ \begin{array}{r} 24 \\ 3 \overline{) 73} \\ \underline{6 } \\ 13 \\ \underline{12} \\ 1 \end{array} $	
b	Independent	Worksheets for division with remainder	Worksheets 3b 3.1 to 3b 3.5

2c	Activity	Process	Materials
1	Unit fractions		
a	INRODUCTION	<p>Tell the story of a cake shared among different groups of students.</p>  <p>Where shall Arun sit?</p> <p><i>There are 4 tables and each table has one cake on it. The first table has 4 students, the second table has 3 students, the third table has 77 students, and the fourth table has 2 students.</i></p> <p><i>Arun can decide where he sits and the cake will be divided equally among the people in one table.</i></p> <p><i>If Arun wants the biggest piece of cake, where will he sit?</i></p> <p><i>Where will he sit if he wants the smallest piece?</i></p> <p>Make the story dramatic and if you can actually make a session with students sitting the way it is described in the story, it will be fantastic.</p> <p>Use the Fraction material to show how the cake will be divided in each table.</p> <p><i>If a table has a total of 4 people and the cake is divided among them equally one person will get "one fourth or 'kaalu" of the cake. That is the name of one piece and the</i></p>	

		<p>symbol for it $\frac{1}{4}$.</p>  <p>In the same way teach the name and symbol of each fractions $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{8}$ etc. Let students explore them and arrive at a conclusion on which one is bigger by comparing the size of each piece.</p> 	
b	Independent	<i>Worksheets for unit fractions</i>	Worksheets 3c 1.1 to 3c 1.5
2.	Non Unit Fractions	<p>Non unit fractions are to be introduced as a collection of unit fractions. For example if we have 3 pieces of $\frac{1}{8}$ it is called $\frac{3}{8}$. And if we have 5 pieces of $\frac{1}{3}$ it is called $\frac{5}{3}$ etc. This can be a teacher led activity and students can work in pairs. One student can ask to show $\frac{3}{8}$ and the other student needs to show three pieces of $\frac{1}{8}$ from the fraction kit.</p>	
b	Independent	<i>Worksheets for non-unit fractions</i>	Worksheets 3c 2.1 to 3c 2.5
3.	Equivalent fractions	<p>Let students explore the different fractions and find equivalency among them. For example take a piece of $\frac{1}{2}$ and ask students <i>how many $\frac{1}{4}$s are required to make the size of $\frac{1}{2}$.</i> By exploring it they will realize that 2 pieces of $\frac{1}{4}$ is required to make a $\frac{1}{2}$. That means $\frac{1}{2}$ is equal to $\frac{2}{4}$. Repeat the exercise with more fractions and try to find the equal fractions.</p>	Worksheets
b	Independent	<i>Worksheets for equivalent fractions</i>	Worksheets 3c 3.1 to 3c 3.5