

Vision Empower & XRCVC
Teacher Instruction KIT
MENTAL ARITHMETIC

Syllabus: Karnataka State Board

Subject: Maths

Grade: 4

Textbook Name: Mathematics Text cum Workbook

Chapter Number & Name: 8, Mental Arithmetic

1. OVERVIEW

1.1 OBJECTIVE & PREREQUISITES

Objective

Students will be able to:

- add multiples of 10 and 100 mentally.
- subtract multiples of 10 and 100 mentally.
- find the product of two numbers by using partial products.

Prerequisite Concept

- Basic mathematical operations and multiples of 10.

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*Kindly Note: Activities marked with * are mandatory*

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2. LEARN

2.1 KEY POINTS

- Mental math is solving sums in one's mind and not working it out on paper. Using Subtraction Facts for 10s, 100s, and 1000s. This strategy involves the subtraction of two numbers in the tens, hundreds, or thousands as if they were single-digit subtraction facts, and then applying the place value to the answer.
- Multiplying by 10 and 100 Using a Place-Value-Change Strategy. This strategy involves keeping track of how the place values change when a number is multiplied by 10 or 100. Start with single-digit numbers multiplied by 10.

2.2 LEARN MORE

3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

Mental math

Activity 1: Mental math

Materials Required: None

Prerequisites: Addition, subtraction, multiplication and division

Activity Flow

- *Inform the students that they are going to play a game.*
- *Say a number aloud.*
- *Give them one minute to find as many ways as they can to make the number using addition, subtraction, multiplication and division.*
- *Give points to the students who find more than 2 ways.*

- Repeat this activity until someone reaches the first 10 points.

3.2 CONCEPT INTRODUCTION ACTIVITIES

Mental computation-Addition

Activity 2: Mental computation-Addition

Materials Required: None

Prerequisites: Addition.

Activity Flow

Addition Facts and Fact Learning Strategies

Note: Mastery of the additional facts is the expectation in Grade 2. This knowledge is then applied to tens, hundreds in Grade 3.

- *If $3 + 4 = 7$, then $30 + 40 = 70$, $300 + 400 = 700$.*
 - a. *For example, for $70 + 80$, 7 tens and 8 tens are 15 tens, or 150.*
- *At the beginning of grade 4, it is important to ensure that students review the additional facts to 18 and the fact learning strategies.*
- *The following are the addition fact strategies with examples, and examples of the same facts applied to tens and hundreds:*
 - a. *Doubles Facts: $4 + 4$, $40 + 40$ and $400 + 400$.*
 - b. *Plus One Facts: (next number) $5 + 1$, $50 + 10$ and $500 + 100$.*
 - c. *Plus Two Facts: (2-more-than facts) $7 + 2$, $70 + 20$ and $700 + 200$*
 - d. *Plus Three Facts: $6 + 3$, $60 + 30$ and $600 + 300$.*
 - e. *Near Doubles: (1-apart facts) $3 + 4$, $30 + 40$ and $300 + 400$.*
 - f. *Plus Zero Facts: (no-change) $8 + 0$, $80 + 0$ and $80 + 0$.*
 - g. *Double Plus 2 Facts: (double in-between or 2-apart facts) $5 + 3$, $50 + 30$ and $500 + 300$.*
 - h. *Make 10 Facts: $9 + 6$, $90 + 60$ and $900 + 600$; $8 + 4$, $80 + 40$ and $800 + 400$*
 - i. *Make 10 Extended (with a 7): $7 + 4$, $70 + 40$ and $700 + 400$.*
- *Ask the students to do the following problems:*
 1. $40 + 40 = ?$
 2. $90 + 90 = ?$
 3. $50 + 50 = ?$
 4. $300 + 700 = ?$
 5. $200 + 400 = ?$
- *Ask the following questions:*

- a. Pavani could accommodate 300 different articles in his shop. After extension, she could keep another 400 articles. How many articles could she accommodate totally?
- b. 150 students enrolled for a school trip. Another 100 students enrolled in the last 3 days. In total, how many students enrolled for the trip?
- c. Vijay deposited 700 in January and 900 in February. How much money did she deposit totally?

Mental computation-Subtraction

Activity 3: Mental computation-Subtraction

Materials Required: None

Prerequisites: Subtraction

Activity Flow

Using Subtraction Facts for 10s, 100s, and 1000s

- *This strategy involves the subtraction of two numbers in the tens, hundreds, or thousands as if they were single-digit subtraction facts, and then applying the place value to the answer.*
- *Examples:*
 - a. *For $80 - 30$, think, 8 tens subtract 3 tens is 5 tens, or 50.*
 - b. *For $85 - 29$, think, $85 - 30 = 55$ and when I add the 1 back on I get 56.*
 - c. *For $145 - 99$, think, $145 - 100$ is 45, but I subtracted 1 too many; so, I add 1 to 45 to 46.*
 - d. *For $900 - 400$, think, subtracting 4 hundreds from 9 hundreds gives 500 hundreds, or 500.*
 - e. *For $92 - 26$, think, 92 subtract 20 (from the 26) is 72 and 72 subtract 6 is 66.*
 - f. *For $745 - 203$, think, 745 subtract 200 (from the 203) is 545 and 545 minus 3 is 542.*

- *Ask the students to solve the following problems mentally.*

Numbers in the 10s

1. $90 - 10 = ?$
2. $65 - 30 = ?$
3. $70 - 19 = ?$
4. $44 - 10 = ?$
5. $39 - 28 = ?$
6. $22 - 17 = ?$

Numbers in the 100s

1. $700 - 300 =$
2. $400 - 100 =$

3. $812 - 700 =$

4. $600 - 499 =$

5. $201 - 100 =$

● *Ask the following questions:*

1. *There are 75 bags of wheat and rice together in the grain stock. The wheat bags are counted as 68 in number. Find the number of rice bags.*
2. *A person had 865. He gave 750 to his wife and 61 to his son. The rest of the money he gave to his daughter. How much did the daughter get?*
3. *Sam had 490. He purchased a hat for 270 and a pair of socks for 100. How much money is with him now?*

Mental computation-Multiplication

Activity 4: Mental computation-Multiplication

Materials Required: None

Prerequisites: Multiplication

Activity Flow

Multiplying by 10 and 100 Using a Place-Value-Change Strategy:

- *This strategy involves keeping track of how the place values change when a number is multiplied by 10 or 100. Start with single-digit numbers multiplied by 10.*
- *For example, in $8 \times 10 = 80$, the 8 ones become 8 tens, an increase of 1 place value. When 8 is multiplied by 100 for a product of 800, the 8 ones increases two places to 8 hundred.*
- *Ask the students to find the number pattern when they multiply 2-digit numbers by 10 or 100. All the place values of the number being multiplied increase one place when multiplying by 10 and two places when multiplying by 100.*
- *Examples:*
 - *For 24×10 , the 2 tens increase one place to 2 hundred and the 4 ones increase one place to 4 tens.*
 - *For 36×100 , the 3 tens increase two places to 3 thousand and the 6 ones increase two places to 6 hundred, 3600.*
- *Ask the students to do the following problems:*
 1. $10 \times 53 =$
 2. $10 \times 34 =$
 3. $87 \times 10 =$
 4. $100 \times 2 =$
 5. $100 \times 15 =$
 6. $100 \times 74 =$

Ask the following questions:

1. In a school for midday meals 7 kg of rice is required daily. What is the quantity of rice required in a month of 31 days for that school?
2. There are 11 benches in class. Each bench has 4 legs. What are the total numbers of legs of all the benches?

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

In our daily life situations many times we work out mathematical calculations.

For example,

- While calculating the amount to be paid for the milkman for a month.
- While collecting change from the vendor.
- While distributing the amount equally for a group.

Mostly, while buying vegetables or groceries or paying auto fare we will do a mental calculation to know how much money needs to be paid and to know how much money needs to get back from the shop keeper or the other person.

Ask the students to think of any three situations where they can use mental calculation.

4. EXERCISES & REINFORCEMENT

4.1 EXERCISES & REINFORCEMENT

Practice and Recall

Activity 4: Practice and Recall

Materials Required: None

Prerequisites: Addition, subtraction and multiplication.

Activity Flow

I. Find the answers to the following questions:

1. Ramesh went to the weekly bazaar and brought the vegetables. He brought 1 kilogram of ladies finger for 120 rupees and 1 kilogram of tomato for 50 rupees. How much money did Ramesh pay to the shopkeeper in total?
2. Reena purchased 2 cakes of soap from the shop. The 1st cake of soap is 20 rupees and the 2nd cake of soap is 50 rupees. Amount to be given by Reena to the shopkeeper is —
3. Venu took a rangoli mesh for 30 rupees and Bhaskar took another one for 40 rupees. How much did they pay in total?
4. Sheela took a toy rabbit for 50 rupees and a toy drum for 30 rupees in a fair. How much did she spend for the toys in total?

II. Complete the blanks with suitable answers.

1. $26 + 40 = ?$
2. $20 + 33 = ?$
3. $53 + 30 = ?$
4. $42 + 10 = ?$

III. Work out the following sums mentally and write the answer in the space provided.

1. $45 + 23 = ?$
2. $33 + 25 = ?$
3. $45 + 43 = ?$
4. $85 + 22 = ?$
5. $68 + 21 = ?$

IV. Do it mentally.

1. $10 + 20 + 30 =$
2. $20 + 20 + 10 =$
3. $50 + 30 + 10 =$
4. $40 + 30 + 20 =$

V. Find the answers:

1. Sunil could accommodate 500 different articles in his shop. After the extension, he could keep another 200 articles. How many articles could he accommodate totally?
2. 200 students enrolled for a school trip. Another 100 students enrolled in the last 3 days. Totally, how many students enrolled for the trip?
3. Pranathi deposited 200 rupees in January and 700 rupees in February. How much money did she deposit totally?

VI. Solve the problems mentally and write the answer.

1. Rekha had 40 rupees with her. She went to a book shop and bought a book for 25 rupees. How much was left with Rekha?
2. Megha brought 400 tender coconuts. She found that 100 out of the coconuts she bought were ripened. How many tender coconuts are left with Megha?

VII. Workout mentally and fill in the blanks.

1. $6 \times 5 = 2 \times 5 + ? \times 5$
2. $5 \times 9 = 5 \times 3 + 5 \times ?$
3. $35 \times 6 = 30 \times 6 + 5 \times ?$

VIII. Do mentally.

1. $(3 \times 6) + (3 \times 2) = (?) + (?)$
2. $(20 \times 4) + (5 \times 4) = (?) + (?)$

IX. Solve the following mentally the product in mind.

1. A railway bogie has 8 wheels. What is the total number of wheels in 15 railway bogies?
2. Sinchana bought 16 baskets. Each basket has 9 flowers. What is the total number of flowers in all the baskets?

4.2 IMPORTANT GUIDELINES*

Exercise Reading

It is very important that the children practice their learnings as well as their reading. Hence have the children read out the newly learned concepts from their textbooks or other available resources.

Perform Textbook Activity

It is good practice to have the children perform the textbook activities. Your textbook activities might not be accessible hence go through this resource to learn how to make textbook content accessible

Provide Homework

To evaluate their understanding and to help the student revise and implement the new learnt concept ensure to provide them with homework. Students should perform one or two of the questions mentioned above or from the textbook exercises with the teacher in Class and the remaining may be given for homework. Also, ensure that the student knows their special skills linked to independently using their accessible books as it will be critical to doing homework independently

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