Vision Empower & XRCVC

Teacher Instruction KIT

Mental arithmetic

Syllabus: Karnataka State Board
Subject: Math
Grade: 5
Textbook Name: Karnataka State Board
Chapter Number & Name: 13. Mental arithmetic

1. OVERVIEW

1.1 OBJECTIVE AND PREREQUISITES

Objective

- Explain the process of estimation
- Explain the process of approximation
- Estimate the sum of two 5 digit numbers to nearest ten thousands place
- Estimate the difference of two 5 digit numbers to the nearest ten thousands place
- Estimate the product of two numbers to the nearest ten thousands place
- Estimate the quotient of two numbers

Prerequisite Concept

- Mental arithmetic

TIK_MATH_G4 _CH8_Mental Arithmetic

Content Index

*Kindly Note: Activities marked with * are mandatory*

2. LEARN

2.1 KEY POINTS

2.2 LEARN MORE

3. ENGAGE

3.1 INTEREST GENERATION ACTIVITY

Activity 1: Race to 27

Materials required: Pack of braille cards
Prerequisites: Counting, addition, subtraction

Activity Flow

Number of players: 4

Game Overview and Basic Rules for Play

The objective of the game is to be the first to reach 27 (or any number that has been decided beforehand). The game starts with the players all being dealt 2 cards each. Players then take

turns to draw cards from the draw pile in the center (if necessary), until a player reaches 27 without spilling over. This player is the winner of the game.

Play instructions:

- *Explain the game to the children. Tell them that they are going to add up the numbers on the cards they get until someone reaches 27. Whoever reaches 27 without crossing over wins the game.*
- *Now, hand the pack to one of the children and ask him/her to deal 2 cards each to all participants.*
- *Gently guide the children through adding up their cards to see what numbers they have.*
- *If there are children who have gone over 27, explain that those who go above the number are out of the game.*
- *If nobody has exactly the number 27 without going over, encourage those who are still in the game to pick a card from the middle.*
- *Ask them to add the number they got to the total of the 2 cards they already have. Again, assist those who need some help in adding.*
- *If time permits, play 2-3 more rounds of the game.*

- *Now, introduce a small change in the way the game is played. After dealing 2 cards each, instead of all the children picking up 1 card each from the draw pile, the children can be given an option of whether or not to pick up another card. After every child has decided and picked cards (some children will also pick up cards, go over 27 and be out of the game), the child whose cards are closest to 27 wins the game.*

- *Similarly, the same game can be played for different numbers. Depending on the grade and children's capacity this game can be extended or played for higher numbers.*

3.2 CONCEPT INTRODUCTION ACTIVITIES

INTRODUCTION TO ESTIMATION

Activity 2: Introduction to estimation

Materials required: None
Prerequisites: Estimation

Activity Flow

1. *Explain to the children that often it is not necessary to have exact numbers. The news items given in the book are examples of why estimates are given sometimes.*
2. *Ask the children if they can provide some examples of such cases.*
3. *Supplement their examples with some of your own:*

a. *Money: It will cost around Rs. 100.*
b. *Time: If the time is 11:57 AM, people are more likely to say that it is nearly 12:00 PM.*
c. *Measurements: Distance between A and B is around 400 KMs.*

Activity 3: Estimation

Materials required: Ice cream sticks / toothpicks, rubber bands
Prerequisites: Estimation

Activity Flow

1. *Make several bundles of sticks containing 10 sticks each.*
2. *Divide children into groups of 3.*
3. *Distribute the sticks to children such that each group has 8 bundles of 10, and 10 individual sticks.*
4. *Also distribute 2 cups to each group.*
5. *Ask children to set out the number 57 using the cups and sticks. The first cup from the left should have 5 stick bundles and the second cup will have 7 individual sticks.*
6. *Ask the children what 10s numbers come before and after 57. The answers are 50 and 60.*
7. *Now, ask them whether the number 7, which is in the units place, is closer to 50 or 60. Count on fingers and explain this if necessary.*
8. *Since it is closer to 60, we round off the number 57 to 60.*
9. *Do a couple of examples using the sticks and the cups to explain.*
10. *Also explain to them that while rounding to the nearest 10, 5 is the landmark number. If the number to be rounded has a number less than 5 in the units place, it is rounded to the lower number and if the number in the units place is more than 5, then it is rounded to the higher number.*
11. *Explain that a similar principle applies while rounding off to the nearest 100, with 50 as the landmark number.*
12. *Similarly, while rounding off to the nearest 1000, with 500 as the landmark number.*

ESTIMATING THE SUM AND THE DIFFERENCES

Activity 4: Estimating the sum and the difference

Materials required: Toothpicks (in packs of 1s, 10s and 100s), paper cups
Prerequisites: Estimation

Activity Flow

1. *Introduce estimating the sum and difference by asking students to predict whether a sum or difference will be larger or smaller than a target number. At first make the questions very obvious. (e.g. Is* $8+8$ *larger or smaller than 10? 10 is the target number,*

Is $80+80$ *larger or smaller than 100? 100 is the target number, Is* $800+800$ *larger or smaller than 1,000?, etc.)*

2. *Divide the children into groups of 3.*
3. *Now, distribute bundles of ice cream sticks to each group. Make sure the children get individual sticks as well.*
4. *Also distribute 6 paper cups to each group.*
5. *Arrange the paper cups such that there are 3 rows of 2 cups each.*
6. *Now, set out an addition problem in the cups. Suppose we are adding 33 and 56. Set out 33 in 2 cups on the top row, set out 56 in the cups in the second row and leave the last row empty to find the sum.*
7. *Explain that in order to estimate the sum, both the numbers involved have to be first rounded off. Ask the students to round the 2 numbers to the nearest 10s and set out those numbers in the cups.*
8. *Now add the numbers in the 10s cups by gathering the bundles of both cups and putting it into the third cup.*
9. *Set out some more problems to solve in this way.*

ESTIMATING PRODUCTS

Activity 5: Estimating products

Materials required: None

Prerequisites: Estimation

Activity Flow

Example:

Estimate the product of 1,249 and 48 to its highest place.

Solution:

1249 is rounded off to nearest thousands as 1000

48 is rounded off to nearest tens as 50

Estimated product is $1000\times 50=50000$

Then, ask the children to verify by actual multiplication. So, give them problems to estimate the products.

ESTIMATING QUOTIENTS

Activity 6: Estimating quotients

Materials required: None

Prerequisites: Estimation

Activity Flow

Example: Estimate the quotient of $44238 / 95$

Solution:

44,238 is rounded off to nearest ten thousands as 40,000

95 is rounded off to nearest tens as 100

Estimated quotient is $40000 / 100 = 400$

Then ask the children to verify by actual division. Also give them the problems to solve by estimation.

3.3 LET'S DISCUSS: RELATE TO DAILY LIFE*

- In real life, estimation is part of our everyday experience. When you're shopping in the grocery store and trying to stay within a budget, for example, you estimate the cost of the items you put in your cart to keep a running total in your head.

4. EXERCISES & REINFORCEMENT

4.1 PRACTICE EXERCISES

Activity 7: Homework problems

Materials required: None

Prerequisites: Estimation

Activity Flow

1. *Estimate the difference of the following by rounding off to the nearest thousands place*
   a. $15345 - 1065$
   b. $3987 - 2000$

2. Estimate the sum of the following by rounding off to the nearest ten thousands place.

1. $56256 + 24872$
2. $47671 + 28745$

3. *Estimate the product of each of the following by rounding off to its highest place.*
   1) 428×54
   2) 878×46
4. *Estimate the quotient of each of the following by rounding off to its highest place.*
   1) $398 / 2$
   2) $786 / 22$
5. *A train can cover 225 km in one hour. Estimate the distance covered in a day to the highest place.*

6. *A carpenter earned rupees 18,634 during the month of November and rupees 32,645 in December. Estimate how much more he earned in December to the nearest ten thousands*
7. *A garment company stitched 16,783 shirts and 12,438 pants in a month. Estimate the total number of dresses stitched to the nearest ten thousands place.*

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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