

DEPARTMENT OF SCHOOL EDUCATION

CBA PRACTICE MATERIAL



MATHEMATICS



Objective of the material:



To enhance mathematical understanding and address low-performing skills and misconceptions identified through 2023-24's classroom-based assessments (CBA) scores.

The intervention will utilize a structured "CBA Practice Material" following a targeted three-stage approach: LEARN, PRACTICE, ASSESS.

What is a misconception?

A misconception is a misunderstanding of a mathematical concept, often due to **incorrect or missing knowledge**. Example: Students misunderstand the concept of grouping hundreds, tens, and ones leading to issues in solving place value problems.

Why do misconceptions happen?

Students tend to develop misconceptions due to several factors. Some of these factors include:

- Concrete to Abstract Transition: When students move from hands-on objects (e.g., counting blocks) to abstract (e.g., numbers, algorithms) without appropriate support, they can form gaps in their understanding, leading to misconceptions.
- Cognitive Development Stages: At different developmental stages, children may not be ready to grasp certain abstract concepts fully, leading to misconceptions.
- Lack of Real-world Application: Difficulty in connecting math concepts to everyday life can lead to misconceptions.
- Lack of Practice and Reinforcement: Repetition and practice of the concept are crucial for building understanding, and without them, misconceptions can become ingrained.

What is the difference between misconceptions and mistakes in Mathematics?

Misconception	Mistake
A misconception is a misunderstanding of a mathematical concept, often due to incorrect or missing knowledge .	A mistake is an error in calculation or judgment that happens accidentally despite having the correct knowledge.
A misconception often stems from incorrect prior knowledge .	A mistake might result from a lapse in attention or calculation.
A misconception requires re-teaching, and re-learning of the conceptual understanding to fix it.	A mistake is temporary and can be corrected immediately .
For example: Students think that a fraction with a bigger denominator is always bigger. Therefore, they say $\frac{1}{5}$ is greater than $\frac{1}{2}$ because 5 is bigger than 2.	For example: A student wrote that the equivalent fraction of $\frac{3}{4}$ is $\frac{6}{7}$. Here the student did 3x3 instead of 4x2 in the denominator by mistake.

How to use this material?



This material contains identified misconception based on the students' CBA scores 2023-24. The misconception can be resolved through three carefully designed components—videos, practice activities, and MCQ-based assessment.

Teacher preparation:

- Read the sample question and understand the misconception well. It is for you to understand the misconception and is not intended for the student.
- After that, watch the video, and read the activity and MCQ questions to familiarize yourself with the sequence and flow of the content. This will help you utilise the material with the students effectively.

Teacher action:

- Assign 2 periods in one week to complete this weekly practice material.
- Each component of the material should be completed in the below sequence.



Step 1 (LEARN) Video: 6-7 minutes (followed by 5-7 minutes of discussion)

Show the YouTube video provided to introduce the concept. The video will provide conceptual understanding, ensuring students can grasp the concept effectively.
Discuss the questions provided to consolidate learnings from the video.



Step 2 (PRACTICE) Activity: 30-35 minutes

Conduct the activity provided to address the misconception and allow students to practice the concept.

Step 3 (ASSESS) Question Bank: 15 minutes



- Write the questions from the question bank on the board and ask the students to solve the same in their notebooks.
- □ In case of the availability of a smart TV, the questions can also be displayed.

Teacher week-wise action plan

- To address multiple misconceptions in grade 4, you will **receive teaching material every** week that must be **completed within the same week**.
- Here is the schedule of the material that you will receive-

18 - 21,	24 - 28,	03 - 07,	10 - 14,	17 - 21,	24 - 28,
February	February	March	March	March	March
CBA	CBA	CBA	CBA	CBA	CBA
Practice	Practice	Practice	Practice	Practice	Practice
Material	Material	Material	Material	Material	Material
1	2	3	4	5	6



Understanding students' misconceptions

Let's analyze the misconception that led students to choose the wrong answer.

QUESTION:

What is the correct representation of 3 thousands + 12 ones on the abacus?



ANSWER ANALYSIS:

- Correct option: Option D
 - **Reason:** Three rings are placed in the thousands place on the abacus and the hundreds place has 0 so there is no ring. The tens place has one ring and ones place has 2 rings because 12 ones is 1 tens and 2 ones. This forms the number 3012.

Common incorrect answer: Option C

• **Incorrect Option Reason:** Students also choose option C because they misunderstand 3 thousand + 12 tens as number 312. Hence, they choose option C which has 3 rings in thousands, 1 ring in hundreds and 2 rings in tens place.

MISCONCEPTION DESCRIPTION:

We can conclude that **students often misunderstand the concept of grouping hundreds, tens, and ones**, leading to issues in solving place value problems.



1. The videos can be accessed either by scanning the following QR code or by clicking on the link.



https://www.youtube.com/watch?v=0nRpjjWzc_8

- After watching the video, ask the following questions to summarise the student's understanding of the video content. Some sample questions that you could ask are-
 - What did you watch in the video?
 - □ What examples were used in the video to explain the topic?
 - □ Can you give a different example of what you saw in the video?



Objective:

Students will be able to

- Identify and recognize the place value of each digit (ones, tens, hundreds, thousands).
- Understand how to read, write, compare, and change numbers into different forms.



- A4 sheets for groups to make their TLMs
- Pencil
- Eraser
- Ruler
- Cardboard to make bundles of 100 (Hundreds), 10 (Tens) & 1 (Ones). Below is a sample-



Activity Instructions:

- 1. Introduction:
 - □ Start with the recall of the concept.
 - \Box Show the number 304.
 - □ Ask students, "How many hundreds, tens, and ones are there?"
 - □ Take a few responses.
 - □ Show how this number can be represented through the prepared TLM of hundreds, tens, and ones as given below.



2. Hands-On Activity:

- \Box Form a group of 5 students.
- $\hfill\square$ Give them a few A4 size papers to make the TLM.
- □ Ask them to make 5 boxes of hundreds, 11 strips of tens, and 20 boxes of ones using the provided material, as shown in the sample image. (This can also be given as homework a day before the activity.)



□ Ask one student to make a place value sheet with ones, tens, and hundreds in his/her notebook.

Hundreds	Tens	Ones

- □ Ask a student to say any number that is less than 500 (e.g., 407).
- □ Another student shows that number using the prepared TLM of hundreds, tens, and ones. (S/he has to show like the teacher showed in the beginning.)
- Ask him/her to identify and write which digit is in the **ones, tens, and hundreds place** in the chart made above.
- Next student will say the next number and ask another student to show that number using the TLM.
- \square Repeat the process until all students have had an equal turn.

(**Note:** Encourage students to give numbers that have zero in either ones, tens or hundreds place. For example: 509, 401, 050, 210, 100.)

3. Reflection and Discussion:

If there was a mistake in placing the numbers, how did you figure out what went wrong?
How did you decide which digit goes into the ones, tens, and hundreds places?

QUESTION BANK

 Identify the number lying between 5000 and 6000, which has 8 in its tens place, that can be formed using the numbers below.



- A. 5682
- B. 5862
- C. 6258
- D. 6582
- Kareena, Sushma, and Rajesh expanded the number to 9329 as shown Kareena: 9 thousands + 3 hundreds + 2 tens + 9 ones Sushma: 9000 + 300 + 20 + 9 Rajesh: (9 x 1000) + (3 x 100) + (2 x 10) + (9 x 1). Who wrote the expanded form correctly?
 - A. Sushma and Kareena
 - B. Kareena and Rajesh
 - C. Rajesh and Sushma
 - D. Kareena, Sushma, and Rajesh
- 3. Which number is formed when you add the following values together?

4000 + 3 + 400 + 4 + 40

- A. 4347
- B. 4434
- C. 4447
- D. 3444
- 4. What is the correct expanded form of the number 5849?
 - A. 5000 + 800 + 40 + 5 + 4
 - B. 5000 + 400 + 9 + 80 + 3
 - C. 4+ 5000 + 800 + 90 + 9
 - D. 5000 + 80 + 400 + 9

5. What is the correct representation of 3 thousands + 12 ones on the abacus?



- 6. Four friends Raju, Seema, Mithra, and Vidya saved their pocket money. When they calculated the money the details are like this. Find and choose the correct option.
 - Raju has 4 ten rupee notes and 2 one rupee coins
 - Seema has 1 ten rupee note and 4 one rupee coins
 - Mithra has 6 ten rupee notes and 3 one rupee coins
 - Vidya has 3 ten rupee notes and 3 one rupee coins

Α.	Raju	33
	Seema	42
	Mithra	63
	Vidya	14

-		
C.	Raju	14
	Seema	33
	Mithra	42
	Vidya	63

-		
В.	Raju	14
	Seema	63
	Mithra	42
	Vidya	33

D.

Raju	42
Seema	14
Mithra	63
Vidya	33



Answers:

1. A

The question states that the number should be between 5000 and 6000. This means options C and D are incorrect because their values are greater than 6000. Another hint given in the question is that the digit 8 should be in the tens place. **Option A** is correct among options A and B because it has 8 in the tens place.

2. D

Option D is correct because all three wrote the expanded form accurately, just in their own unique ways.

3. C

Option C is correct because there are two numbers in the one's place. When writing the expanded form, we need to add both numbers in the ones place. So, adding them together: 4000 + 3 + 400 + 4 + 40 gives a total of 4447.

4. A

Option A is correct because there are two numbers in the ones place. When calculating the total, we need to include both values in the ones place. Adding them together: 5000 + 800 + 40 + 5 + 4 gives a total of 5849.

5. D

Option D is correct because three rings are placed in the thousands place on the abacus, the hundreds place has 0, the tens place has one ring because out of 12 ones, it became 1 tens and 2 ones. This forms the number 3012.

6. D

Option D is correct because:

- Raju has 4 ten-rupee notes and 2 one-rupee coins, making 42.
- Seema has 1 ten-rupee note and 4 one-rupee coins, making **14**.
- Mithra has 6 ten-rupee notes and 3 one-rupee coins, making **63**.
- Vidya has 3 ten-rupee notes and 3 one-rupee coins, making 33.