THE PRESIDENT'S RECOVERY PRIORITIES
Education

Ministry of Education, Science and Technology

Lesson plans for

PRIMARY *Mathematics*

5 CLASS

1 TERM

Foreword

Our country's future lies in the education of our children. The Government of Sierra Leone is committed to doing whatever it takes to secure this future.

As Minister of Education, Science and Technology since 2007, I have worked every day to improve our country's education. We have faced challenges, not least the Ebola epidemic which as we all know hit our sector hard. The Government's response to this crisis – led by our President – showed first-hand how we acted decisively in the face of those challenges, to make things better than they were in the first place.

One great success in our response was the publication of the Accelerated Teaching Syllabi in August 2015. This gave teachers the tools they needed to make up for lost time whilst ensuring pupils received an adequate level of knowledge across each part of the curriculum. The Accelerated Teaching syllabi also provided the pedagogical resource and impetus for the successful national radio and TV teaching programs during the Ebola epidemic.

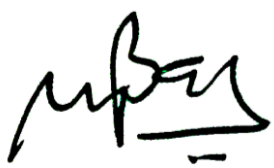
It is now time to build on this success. I am pleased to issue new lesson plans across all primary and JSS school grades in Language Arts and Mathematics. These plans give teachers the support they need to cover each element of the national curriculum. In total, we are producing 2,700 lesson plans – one for each lesson, in each term, in each year for each class. This is a remarkable achievement in a matter of months.

These plans have been written by experienced Sierra Leonean educators together with international experts. They have been reviewed by officials of my Ministry to ensure they meet the specific needs of the Sierra Leonean population. They provide step-by-step guidance for each learning outcome, using a range of recognised techniques to deliver the best teaching.

I call on all teachers and heads of schools across the country to make best use of these materials. We are supporting our teachers through a detailed training programme designed specifically for these new plans. It is really important that these Lesson Plans are used, together with any other materials you may have.

This is just the start of education transformation in Sierra Leone. I am committed to continue to strive for the changes that will make our country stronger.

I want to thank our partners for their continued support. Finally, I also want to thank you – the teachers of our country – for your hard work in securing our future.



Dr. Minkailu Bah

Minister of Education, Science and Technology

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PRIMARY *Mathematics*

Introduction
to the Lesson Plan Manual

These lesson plans are based on the National Curriculum and meet the requirements established by the Ministry of Education, Science and Technology.

1. The lesson plans will not take the whole term, so use spare time to review material or prepare for exams.
2. Teachers can use other textbooks alongside or instead of these lesson plans.
3. Read the lesson plan before you start the lesson. Look ahead to the next lesson, and see if you need to tell pupils to bring materials for next time.
4. Make sure you understand the learning outcomes, and have teaching aids and other preparation ready – each lesson plan shows these using the symbols on the right.
5. Quickly review what you taught last time before starting each lesson.
6. Follow the suggested time allocations for each part of the lesson. If time permits, extend practice with additional work.
7. Lesson plans have a mix of activities for the whole class and for individuals or in pairs.
8. Use the board and other visual aids as you teach.
9. Interact with all pupils in the class – including the quiet ones.
10. Congratulate pupils when they get questions right! Offer solutions when they don't, and thank them for trying.


Learning outcomes


Teaching aids


Preparation

Lesson Title: Place value up to 100,000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-001	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to tell the place value of any digit of a number up to 100,000.	**Teaching Aids** None	**Preparation** Write the opening questions on the board.

Opening *(4 minutes)*

1. Write and **say:** I have underlined a digit in each number below to remind us of the place value. First let's read these numbers aloud. Raise your hand to read the number aloud.
2. Invite 2 different pupils to read the number aloud.
   a. 5<u>6</u> (6, Ones)
   b. <u>4</u>97 (400, Hundreds)
   c. 2<u>9</u>9 (90, Tens)
3. **Ask:** Which number is in the Ones place? Raise your hand to answer. (Answers: a. 6, b. 7, c. 9)
4. **Ask:** Which number is in the Tens place? Raise your hand to answer. (Answers: a. 5, b. 9, c. 9)
5. **Ask:** Which number is in the hundreds place? Raise your hand to answer. (Answers: a. no number, b. 4, c. 2)
6. **Say**: Today you will learn how to tell the place value of any digit of a number up to 100,000.

Introduction to the New Material *(10 minutes)*

1. Write the following on the board: '134,629 (one hundred and thirty-four Thousand, six hundred and twenty-nine)'
2. **Ask:** Who can read this number?
3. Invite 2 different pupils to read the number aloud.
4. **Say** and write**:** Let's expand this number to see the place value.
   134,629 = 100,000+ 30,000 + 4000 + 600 + 20 + 9
5. **Say**: Now you can see the place value expanded out. Let's review the place values using a table.
6. Draw:

Place Value	**Hundred Thousands**	**Ten Thousands**	**Thousands**	**Hundreds**	**Tens**	**Ones**
Digit	1	3	4	6	2	9
Value	100,000	30,0000	4000	600	20	9

7. **Say**: This table will help us understand place value versus value and how to name the place value of any digit.
8. Underline 2 and **ask**: What is the value of 2?
9. **Say**: The value of the 2 is 20 because the 2 is in the Tens place and 2 x 10 = 20
10. **Say**: However, the place value of 2 is Tens or the position the number is in the number. Be careful to answer the problem correctly depending on whether they are asking you for place value or value.

11. **Ask:** What is the place value of 4? Raise your hand to answer. (Answer: Thousands)
12. **Ask:** What is the value of 3? Raise your hand to answer. (Answer: 30,000)
13. **Ask:** What is the place value of 3? Raise your hand to answer. (Answer: Ten Thousands)
14. **Ask:** Which number is in the Tens place? Raise your hand to answer. (Answer: 2)
15. Write the following on the board: '91, 512'
16. **Ask:** Who can read this number? Raise your hand to answer. (Answer: ninety-one Thousand, five Hundred and twelve)
17. Invite 2 different pupils to read the number.
18. Ask all the pupils to say the number together.
19. **Underline** 5 and **ask**: What is the value of 5? Raise your hand to answer. (Answer: 500)
20. **Ask:** What is the place value of 5? Raise your hand to answer. (Answer: Hundreds)
21. **Ask:** What is the value of 9? Raise your hand to answer. (Answer: 90,000)
22. **Ask:** What is the place value of 9? Raise your hand to answer. (Answer: Ten Thousands)
23. **Ask:** Which number is in the Thousands place? Raise your hand to answer. (Answer: 1)

Guided Practice *(8 minutes)*

1. Put pupils in pairs.
2. Write on the board: 'Find the value and place value of 9s in the following numbers:'
   a. 91,788 (Answer: 90,000, ten Thousands)
   b. 12,945 (Answer: 900, Hundreds)
   c. 909 (Answer: 900, Hundred and 9, Ones)
   d. 89,657 (Answer: 9,000, Thousands)
3. Ask them to solve the question.
4. Walk around the room, check their work, discuss with them and assist where necessary.
5. As you walk around, invite 2 pairs to go and write their solution on the board. Tell the other pupils to check their work as the pupils complete the work on the board.

Independent Practice *(8 minutes)*

1. Ask pupils to do the following exercise in their notebooks individually.
2. Write on the board: 'Find the value and place value of the underlined digit in the following numbers:'
   a. 9<u>8</u>,765 (Answer: 8,000, Thousands)
   b. <u>1</u>1,811 (Answer: 10,000, ten Thousands)
   c. 40,0<u>1</u>0 (Answer: 10, Tens)
   d. 12,<u>3</u>45 (Answer: 300, Hundreds)
   e. <u>1</u>09,999 (Answer: 100,000, hundred Thousands)
3. Walk around the class and check on pupils.
4. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. Play the following game with the pupils:

a) **Say:** Take your pencils and get ready. I know a certain number, the number has 8 in the ten Thousands place, 8 in the Thousands place, 0 in the hundreds place, 0 in the Tens place and 0 in the Ones place. What number is it? Raise your hand to answer. (Answer: 88,000)
b) **Say:** I know a certain number, the number has 4 in the ten Thousands place, 0 in the Thousands place, 5 in Hundreds place, 0 in the Tens place and 2 in the Ones place. What number is it? Raise your hand to answer. (Answer: 40,502)

Lesson Title: Counting to 100,000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-002	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to count numbers up to 100,000 forwards and backwards from any numbers in multiples of 10, 100 and 1000.	 **Teaching Aids** None	 **Preparation** Draw a place value chart on the board.

Opening *(5 minutes)*

1. **Say:** Let's count aloud by 10s to 100. (Answer: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)
2. **Say:** Let's count backwards from 2,500 by 10s up to 2,400. (Answer: 2500, 2490, 2480, 2470, 2460, 2450, 2440, 2430, 2420, 2410, 2400)
3. **Say:** Let's count by 10 from 150 to 200. (Answer: 150, 160, 170, 180, 190, 200)
4. **Say:** Let's count by 100s from 500 to 1,500. (Answer: 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500)
5. **Say:** Let's count backwards by 100 from 1000. (Answer: 1,000, 900, 800, 700, 600, 500, 400, 300, 200, 100)
6. Write on the board: 1234
7. **Ask**: What is the value of 2, value of 3 and value of 1? Raise your hand to answer. (Answer: 200, 30, 1000)
8. **Say**: Today you will learn how to count forwards and backwards by multiples of 10, 100 and 1000 up to 100,000.

Introduction to the New Material *(10 minutes)*

1. Ask pupils to select one person they are sitting with as their partner.
2. Write on the board: 10,000
3. **Ask:** Who can read this number? Raise your hand to answer.
4. **Say:** Take turns to read the number to your partner.
5. Call on 2 different pupils to read the number.
6. Ask all the pupils to say the number together.
7. Write on the board: Count up by 1000 from 15,000 to 20,000 with your partner. (Answers: 15,000, 16,000, 17,000, 18,000, 19,000, 20,000)

8. Ask each pupil to record the numbers on a place value chart

Ten Thousands	Thousands	Hundreds	Tens	Ones
1	5	0	0	0
1	6	0	0	0
1	7	0	0	0
1	8	0	0	0
1	9	0	0	0
2	0	0	0	0

9. **Ask:** What do you notice? Raise your hand to answer. (Answer: When we count up by 1,000, the numbers in the thousands column increase by one each time, and the other numbers remain the same.)
10. Write on the board and **say**: Count backwards by Hundreds from 12,500 to 12,000 with your partner. (Answer: 12,500, 12,400, 12,300, 12,200, 12,100, 12,000)

Ten Thousands	Thousands	Hundreds	Tens	Ones
1	2	5	0	0
1	2	4	0	0
1	2	3	0	0
1	2	2	0	0
1	2	1	0	0
1	2	0	0	0

11. **Ask:** What do you notice? Raise your hand to answer. (Answer: When we count down by Hundreds, the numbers in the Hundreds column reduce by one each time, and the other numbers remain the same.)

Guided Practice *(8 minutes)*

1. Put pupils in pairs.
2. Write on the board: Fill in the blanks for the following:
   a. 16,000, ___, ___, 19,000, 20,000, ___
   b. ___, 25,299, 25,399, ___, ___, 25,699
   c. 22,222, 22,232, ___, ___, 22,262

   (Answers: a. 17,000, 18,000, 21,000; b. 25,199, 25,499, 25,599; c. 22,242, 22,252, 22,272)
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. As you walk around, ask 3 different pairs to fill in the blanks on the board.

5. **Ask:** What happens when we count up by Hundreds? Raise your hand to answer. (Answer: When we count up by Hundreds, the numbers in the Hundreds column increase by one each time, and the other numbers remain the same.)
6. **Ask:** What happens when we count down by Hundreds? Raise your hand to answer. (Answer: When we count down by Hundreds, the numbers in the Hundreds column reduce by one each time, and the other numbers remain the same.)

Independent Practice *(8 minutes)*

1. Ask pupils to do the following exercise in their notebooks individually.
2. Write on the board and **say**: 'Fill in the blanks for the following:
   a. ___, 72,442, 71,442, ___, ___, 68,442
   b. 91,288, ___, ___, 91,258, 91,248, ___.

   (Answers: a. 73,442, 70,442, 69,442; b. 91,278, 91,268, 91,238)
3. Walk around the class and check on pupils.
4. Invite two pupils to solve the problem on the board, and ask the others to pay attention.
5. Have pupils to exchange their books and check their work.

Closing *(4 minutes)*

1. Write on the board and **say**: Find the rule for the following:
   a. 11,011, 10,911, 10,811, 10,711, 10,611, 10,511 (Answer: a. Count down by 100)

Lesson Title: Reading and Writing Numbers Up to 100,000 in Numerals	**Theme:** Numbers and Numeration	
Lesson Number: M-05-003	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to read and write numbers up to 100,000.	 **Teaching Aids** None	 **Preparation** Write the problems from the Guided Practice and Independent Practice on the board.

Opening *(3 minutes)*

1. Write the following numbers on the board and **ask** pupils to read them aloud:
    a. 2400
    b. 567
    c. 88
2. **Say**: Write the numbers using words in your exercise books. Raise your hand to answer. (Answers: Two thousand four hundred, five hundred and sixty-seven, eighty-eight)
3. **Say**: Today you will learn how to read and write numbers up to 100,000.

Introduction to the New Material *(10 minutes)*

1. Ask pupils to select one person they are sitting with as their partner.
2. Write on the board: 10,000.
3. **Ask:** Who can read this number? Raise your hand to answer.
4. Call on 2 different pupils to read the number.
5. Ask all the pupils to say the number together.
6. Then write the number in words on the board: Ten thousand.
7. Write on the board: 85,443.
8. **Ask:** Who can read this number? Raise your hand to answer.
9. Call on 2 different pupils to read the number.
10. Ask all the pupils to say the number together.
11. Then write the number in words on the board: Eighty-five thousand, four hundred and forty-three.
12. Write on the board: Fifteen thousand and five.
13. **Ask:** Who can read this? Raise your hand to answer.
14. Call on 2 different pupils.
15. Ask pupils to write the number in figures. (Answer: 15,005)
16. Read the number to pupils again: Fifteen thousand and five.

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write on the board and **say**: Write the following number names using figures:
    a. Thirty-three thousand three hundred and thirty-nine
    b. Eleven thousand nine hundred and four

c. Forty thousand and six
d. Seventy-five thousand six hundred and eleven
e. Ninety-three thousand seven hundred and thirty

(Answers: a. 33,339 b. 11,904 c. 40,006 d. 75,611 e. 93,730)

3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. As you walk around, ask 5 different pairs to write their answers on the board.

Independent Practice *(8 minutes)*

1. Ask pupils to do the following exercise in their classwork books individually.
2. Write on the board and say: Write the following numbers in words:
    a. 87,009
    b. 22,344
    c. 67,591

    (Answers: a. Eighty-seven thousand and nine b. twenty-two thousand three hundred and forty-four c. sixty-seven thousand five hundred and ninety-one)

3. Write on the board and **say**: Write the following number names using figures:
    a. ninety-nine thousand and nine
    b. seventeen thousand seven hundred and seventy-three

    (Answers: a. 99,009 b. 17,773)

4. Walk around the class and check on pupils.
5. Ask pupils to write their answers on the board and ask the others to pay attention.
6. Have pupils to exchange their books and check their work.

Closing *(4 minutes)*

1. Play the following game with the pupils:
    a. Invite five pupils to volunteer to play.
    b. Ask each pupil to give you a one-digit number.
    c. Write the five new digits on the board and ask pupils to name the number.
    d. Ask pupils to write down the number in word form.
    e. Repeat as time permits.

Lesson Title: Comparing and ordering numbers up to 100,000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-004	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to compare and order numbers up to 100,000.	 **Teaching Aids** Place value chart	 **Preparation** Draw a place value chart on the board.

Opening *(5 minutes)*

1. Write the following numbers on the board and ask pupils to arrange them from least to greatest: 19,001, 949, 8,122 (Answer: 949, 8,122, 19,001)
2. Ask pupils to share their work with their partner and explain their answer.
3. Invite one pupil to explain their thinking.
4. **Say**: Today you will learn how to compare and order numbers up to 100,000.

Introduction to the New Material *(10 minutes)*

1. Write the following symbols on the board: '<, >, ='.
2. **Say**: You will use these symbols to make comparisons between numbers.
3. Write:
    a. < means less than
    b. > means greater than
    c. = means equal to
4. Ask pupils to use one symbol in a number sentence.
   (Example answers: 5,400 > 1,455 1,234 < 2,345)
5. Write on the board: Which number is greater: 28,991 or 28,499?
6. Draw the place value chart and place the numbers in the chart.

Ten Thousands	Thousands	Hundreds	Tens	Ones
2	8	9	9	1
2	8	4	9	9

7. **Say**: We can use this chart to help us see which number is greater. Start to the left, both numbers have a 2 in the Ten Thousands place. So move to the right. Each number has an 8 in the thousands place so move to the right. One number has a 9 which is bigger than 4 so 28,991 is greater than 28,499.
8. Write and **say**: We can use the symbols to show this comparison:
   28,991 > 28,499
9. Write on the board: Which number is greater: 80,009 or 19,999?

10. In the place value chart, have pupils write each digit in its place while you write it on the board.

Ten Thousands	Thousands	Hundreds	Tens	Ones
8	0	0	0	9
1	9	9	9	9

11. Ask which number is greater? Raise your hand to answer. (Answer: 80,009)
12. Ask pupils to explain. Raise your hand to answer. (Answer: 80,009 has 8 Ten Thousands while 19,999 has 1 Ten Thousand, so 80,009 is greater than 19,999)
13. **Ask:** 19,999 has four 9s in it. Why is it less than 80,009 which has more zeros? Raise your hand to answer.
    (Answer: The place value of the number helps us to see how large a number is, not the digits alone.)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write the following numbers on the board and ask pupils which number is greater: 34,224 or 34,922
3. In the place value chart, have pupils write each number in its place.

Ten Thousands	Thousands	Hundreds	Tens	Ones
3	4	2	2	4
3	4	9	2	2

4. **Ask** which number is greater? Raise your hand to answer. (Answer: 34,922)
5. **Ask:** Can you write this using a comparison symbol?
6. Write**:**
    34,922 > 34,224
7. **Ask:** Why is 34,922 greater than 34,224? Raise your hand to answer. (Answer: Starting with the largest place value, we see that the two numbers have the same number of Ten Thousands and the same number of Thousands, but 34,922 has 9 Hundreds while 34,224 has 2 Hundreds, so 34,922 is greater than 34,224.)

Independent Practice *(8 minutes)*

1. Ask pupils to do the following exercise in their notebooks individually.
2. Write the following on the board: 'Put the numbers in order from the smallest to the greatest:'

    a. 18,977, 81,998, 45,345
    b. 45,007, 77,658, 44,877
    c. 26,755, 23,980, 28,770
    (Answer: a. 18,977, 45,345, 81,998; b. 44,877, 45,007, 77,658; c. 23,80, 26,755, 28,770)

3. Ask pupils to write and explain their answers in their notebooks.

4. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. Write the following on the board: Put the numbers in order from the smallest to the greatest:
   a. 90,909, 90,998, 99,887, 94,438, 97,763, 90,002, 90,887

   (Answer: a. 90,002, 90,887, 90,909, 90,998, 94,438, 97,763, 99,887)

2. **Ask:** What process did you use to put the numbers in order? Raise your hand to answer. (Answer: I started at the left and looked at the Ten Hundreds place and then moved to the right to order the numbers from smallest to greatest.)
3. **Say:** Good job today pupils! You learned how to compare and order numbers using comparison symbols.

Lesson Title: Locating Numbers Up to 100,000 on the Number Line	**Theme:** Numbers and Numeration	
Lesson Number: M-05-005	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to locate numbers up to 100,000 on the number line.	**Teaching Aids** None	**Preparation** Draw a number line on the board.

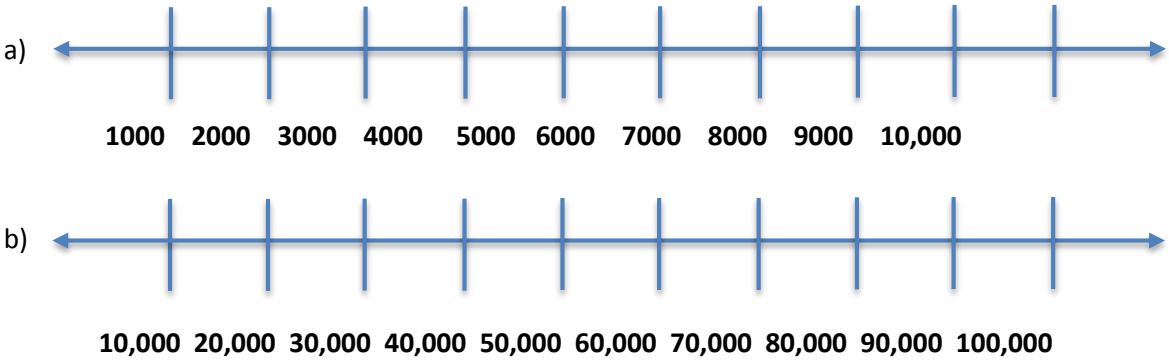
Opening *(5 minutes)*

1. Draw the following number line on the board:

2. **Say:** This is a number line and we can use it to place numbers and see how one is bigger than the other.
3. **Ask:** What do you notice about the numbers I've written under the number line? Raise your hand to answer. (Example answers: they get bigger from left to right, they get smaller from right to left, there are only 6 numbers, there are arrows on the ends of the line)
4. **Say:** The arrows on the ends of the line mean that the line goes on and on forever and if we extend it, the numbers will also keep going.
5. **Ask:** What is the next number to the right of 6? Raise your hand to answer. (Answer: 7)
6. **Ask:** What is the number to the left of 1? Raise your hand to answer. (Answer: 0)
7. **Say**: Today you will learn how to locate numbers on a number line.

Introduction to the New Material *(10 minutes)*

1. Draw the following number lines on the board:



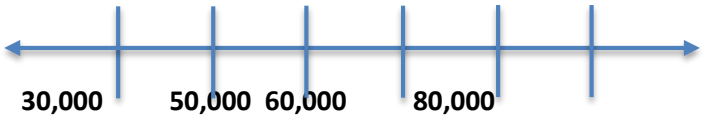
2. Ask pupils to look at the patterns of the numbers on the number lines and draw them.
3. **Say**: The first number line starts with 1000 and goes up by 1000 each time. There are also numbers in between the 1000 to 2000
4. **Ask:** Where do you think 1500 will be? Raise your hand to answer.

(Answer: It will be directly in the middle between the 1000 and 2000)

5. **Say:** On the second number line, the intervals go up by 10,000 each time.
6. **Ask:** Where will 5000 be on this number line? Raise your hand to answer.
   (Answer: To the left of the 10,000.)
7. Tell pupils that the number lines can be in multiples of 10, 100, 1000 and 10,000.
8. Review with pupils how to locate selected numbers on the number lines.
9. Draw different number lines on the board with varying numbers arranged in increasing order.

Guided Practice *(8 minutes)*

1. Put pupils into groups.
2. Draw number lines and leave the following gaps for pupils to fill in:

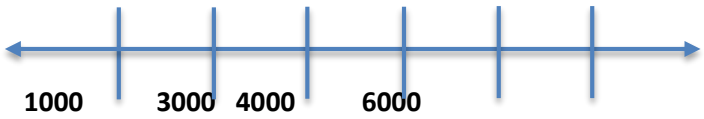


3. Ask each group to write down their answers in their exercise books.
4. Visit each group, check on their work, discuss with them and assist where necessary.
5. Ask a member from any group to come to the board and copy their answer on the board.
6. Ask all others to compare and discuss until they identify the patterns.

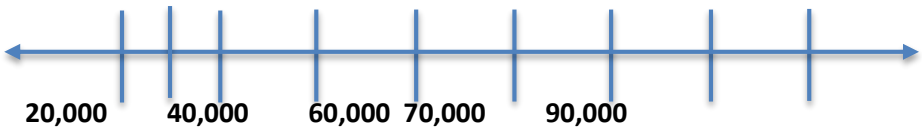
Independent Practice *(8 minutes)*

1. Write beneath the number lines on the board the following number sequences, including the gaps.

   a.



   b.



2. Ask pupils to solve the problems independently in their exercise books.
3. Go around and check their work and make necessary corrections.

Closing *(4 minutes)*

1. Call a few of those who got the answers correct to come to the board and show how they got their answers. (Answer: a. 2000, 5000 the numbers go up by 1000 for each interval, b. 25,000, 30,000, 50,000, 80,000, the large intervals go up by 10,000)
2. **Say**: Good job today pupils! You learnt how to locate numbers on the number line.

Lesson Title: Rounding Whole Numbers Up to 100,000 to the Nearest 10	**Theme:** Numbers and Numeration	
Lesson Number: M-05-006	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to round whole numbers up to 100,000 to the nearest 10.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. Write**:** 'estimate' on the board.
2. **Ask:** What do you think this word mean? Raise your hand to answer.
   (Example answers: Approximate, gauge, guess)
3. **Ask:** What do we use estimates for? Raise your hand to answer.
   (Example answers: To describe a number or quantity guess an answer to a math question, talk about time)
4. **Say:** In mathematics, and in life, we use estimates in different ways. Today's lesson will round whole numbers to the nearest 10, which is a form of estimation.

Introduction to the New Material *(10 minutes)*

1. Write on the board: **'**Round 34,987 to the nearest 10'
2. **Say:** To round a number to the nearest 10, the number in the ones place must be zero.
3. **Point** to the place values as you say this**.** Underline the 8 in the tens place.
4. **Say:** If the digit in the ones place is less than 5, you round down and replace the digit in the ones place with 0. If the digit in the ones place is 5 or more, you round up and add 1 to the tens digit.
5. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 7)
6. **Say:** Since 7 is greater than 5, we add 1 to the digit in the Tens place, which is 8, so 34,987 to the nearest 10 will be 34,990.
7. Write on the board: 'Round 8574 to the nearest 10'
8. Ask a pupil to read the number 8574 out loud. Raise your hand to answer. (Answer: Eight thousand five hundred and seventy-four)
9. **Ask:** Which tens is 8,574 between? Raise your hand to answer. (Answer: 8570 and 8580)
10. **Ask:** Is 8574 closer to 8570 or 8580? Raise your hand to answer. (Answer: 8570)
11. **Say:** Let's find out.
12. **Ask:** Which digit is in the ones place? (Answer: 4)
13. **Say:** To round 8,574 to the nearest 10, we first consider the number in the ones place.
14. Underline 4.
15. **Say:** Since the digit in the ones place is 4, which is less than 5, we round down. This means we write 0 in place of 4, and 8574 rounded to the nearest tens place is 8570.
16. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
17. Write: Round 78,389 to the nearest 10.
18. Ask a pupil to read the number 8574 out loud. Raise your hand to answer.
    (Answer: Seventy-eight Thousand three Hundred and eighty-nine)

19. **Ask:** Which tens is 78,389 between? Raise your hand to answer. (Answer: 78,380 and 78,390)
20. **Ask:** Is 78,389 closer to 78,380 or 78,390? Raise your hand to answer. (Answer: 78,390)
21. **Say:** Let's find out.
22. **Ask:** Which digit is in the Ones place? Raise your hand to answer. (Answer: 9)
23. **Say:** To round 78,389 to the nearest 10, we first consider the number in the ones place.
24. Underline 9.
25. **Say:** Since the digit in the Ones place is 9, which is greater than 5, we round up. This means we write 0 in place of 9. We add 1 to the digit in the tens place. And so, 78,389 rounded to the nearest Tens place is 78,390.
26. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
27. **Say:** You will see that when we round to the nearest Ten, the digit in the ones place will always be replaced with a zero.

Guided Practice *(10 minutes)*

1. Ask pupils to work in pairs.
2. Write the following numbers on the board and **say**: Round to the nearest 10:

   a. 32,915
   b. 44,356
   c. 89,976
   d. 65,880
   (Answers: a. 32,920, b. 44,360, c. 89,980, d. 65,880)

3. Invite pupils to write their answers on the board while pupils at their desk check their work.
4. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
5. Walk around the room, check pupils' work, discuss with them and assist where necessary.

Independent Practice *(8 minutes)*

1. Ask pupils to work individually.
2. Write:

   'I am a 5-digit number.
   Rounded up I am 22,390.
   My ones digit is odd.
   Who am I?'
   (Example answers: 22,385, 22,386, 22,387, 22,388, 22,389)

3. **Ask:** Why is 22,393 not a solution to this problem? Raise your hand to answer.
   (Answer: The question states 'rounded **up**'**,** not 'rounded **down**'. If 22,393 is a solution, the number would be rounded down.)
4. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. **Say:** Look at all the numbers we rounded today.
2. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
3. **Ask:** What pattern do you notice? Raise your hand to answer. (Answer: When we round to the nearest 10, the number in the Ones place is 0.)

Lesson Title: Rounding Whole Numbers up to 100,000 to the Nearest 1000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-007	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to round whole numbers up to 100,000 to the nearest 1000.	 **Teaching Aids** None	 **Preparation** None

Opening *(2 minutes)*

1. Write and **say**: Round 34,588 to the nearest 10. Raise your hand to answer. (Answer: 34,590)
2. **Ask:** What happens to the ones digit when we round a number to the nearest 10? Raise your hand to answer. (Answer: It becomes 0)
3. **Say**: Today you will learn how to round whole numbers to the nearest 1000.

Introduction to the New Material *(10 minutes)*

1. Write the following on the board:
   56,789
2. **Say:** To round a number to the nearest 10, the number in the Ones place must be zero. Today, we will round to the nearest 1000.
3. Point to the number on the board to help explain.
4. **Say:** If the digit in the Hundreds place is less than 5, you round down and replace the digit in the Hundreds, Tens and Ones place with 0. If the digit in the Hundreds place is 5 or more, you round up and add one to the Thousands digit.
5. Write Round 45,655 to the nearest 1000' on the board, and ask pupils to write it in their exercise books.
6. Ask a pupil to read the number 45,655. Raise your hand to answer.
   (Answer: Forty-five thousand six hundred and fifty-five)
7. **Ask:** Which Thousands is 45,655 between? Raise your hand to answer.
   (Answer: 45,000 and 46,000)
8. **Ask:** Is 45,655 closer to 45,000 or 46,000?
9. **Say:** Let's find out.
10. **Ask:** Which digit is in the Hundreds place? Raise your hand to answer. (Answer: 6)
11. **Say:** To round 45,655 to the nearest 1000, we first consider the digit in the Hundreds place.
12. Underline 6
13. **Say:** Since the number in the Hundreds place is 6, which is greater than 5, we round up. This means we add one to the digit in the thousands place, and so 45,655 rounded to the nearest 1000 is 46,000
14. **Ask:** What digit is in the Ones place? Raise your hand to answer. (Answer: 0)
15. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
16. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)
17. Write on the board: Round 53,332 to the nearest 1000.

18. Ask a pupil to read the number. Raise your hand to answer. (Answer: Fifty-three thousand three hundred and thirty-two)
19. **Ask:** Which thousands is 53,332 between? Raise your hand to answer. (Answer: 53,000 and 54,000)
20. **Ask:** Is 53,332 closer to 53,000 or 54,000? Raise your hand to answer. (Answer: 53,000)
21. Say: Let's find out.
22. **Ask:** Which digit is in the Hundreds place? Raise your hand to answer. (Answer: 3)
23. **Say:** To round 53,332 to the nearest 1,000, we first consider the digit in the Hundreds place.
24. Underline 3.
25. **Say:** Since the number in the Hundreds place is 3, which is less than 5, we round down. This means we replace the Hundreds, Tens and Ones digits with 0. And so, 53,332 rounded to the nearest 1000 is 53,000.
26. **Ask:** What digit is in the Ones place? Raise your hand to answer. (Answer: 0)
27. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
28. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write the following numbers on the board and ask pupils to round them to the nearest 1000: a. 89,745 b. 37,465 c. 98,005 d. 50,998' (Answers: a. 90,000, b. 38,000, c. 98,000, d. 51,000)
3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. As you walk around, ask 4 different pairs to write their answers on the board.
5. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
6. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
7. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)

Independent Practice *(8 minutes)*

1. Have pupils copy the problems into their notebooks and solve them individually.
2. Write the following numbers on the board and ask pupils to round them to the nearest 1000:

   'a. 32,915 b. 44,356 c. 89,976 d. 65,880' (Answers: a. 33,000, b. 44,000, c. 90,000, d. 66,000)

3. Ask pupils to write their answers on the board.
4. Have pupils to exchange their books and check their work as you read the answers aloud.

Closing *(5 minutes)*

1. Write on the board: Round 97,655 to the nearest 1000. (Answer: 98,000)
2. **Say:** Look at all the numbers we rounded to the nearest 1000 today.
3. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
4. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
5. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)

6. **Say:** Remember, when we round to the nearest 1000, the digits in the Hundreds, Tens and Ones places are all 0.
7. **Say:** Good job today pupils! We rounded off numbers to the nearest 1000.

Lesson Title: Rounding Whole Numbers Up to 100,000 to the Nearest 10,000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-008	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to round whole numbers up to 100,000 to the nearest 10,000.	 **Teaching Aids** None	 **Preparation** None

Opening *(2 minutes)*

1. Write on the board: Round 34,588 to the nearest 10. Raise your hand to answer. (Answer: 34,590)
2. Write on the board: Round 34,588 to the nearest 1000. Raise your hand to answer. (Answer: 35,000)
3. **Ask:** What happens to the Ones digit when we round a number to the nearest 10? Raise your hand to answer. (Answer: It becomes 0.)
4. **Ask:** What happens when you round to the nearest 1000? Raise your hand to answer. (Answer: The digits in the Hundreds, Tens and Ones places all become 0)
5. **Say**: Today you will learn how to round numbers to the nearest 10,000.

Introduction to the New Material *(10 minutes)*

1. **Say:** If the digit in the Thousands place is less than 5, you round down and replace the digit in the Thousands place with 0. If the digit in the Thousands place is 5 or more, you round up and add ne to the Ten Thousands digit.
2. Write on the board: 'Round 87,546 to the nearest 10,000'.
3. Ask a pupil to read the number 87,546. Raise your hand to answer. (Answer: Eighty-seven thousand five hundred and forty-six)
4. **Ask:** Which Ten Thousands is 87,546 between? Raise your hand to answer. (Answer: 80,000 and 90,000)
5. **Ask:** Is 87,546 closer to 80,000 or 90,000? Raise your hand to answer. (Answer: 90,000)
6. **Say**: Let's find out.
7. **Ask:** Which digit is in the Thousands' place? Raise your hand to answer. (Answer: 7)
8. **Say:** To round 87,546 to the nearest 10,000, we first consider the digit in the Thousands place.
9. Underline 7
10. **Say:** Since the number in the Thousands place is 7, which is greater than 5, we round up. This means we add one to the digit in the Ten Thousands place, and so 87,546 rounded to the nearest 10,000 is 90,000.
11. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
12. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
13. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)
14. **Ask:** What digit is in the Thousands place? Raise your hand to answer. (Answer: 0)
15. Write on the board: 'Round 34,598 to the nearest 10,000'.

16. Ask a pupil to read the number 34,598. Raise your hand to answer. (Answer: Thirty-four thousand five hundred and ninety-eight)
17. **Ask:** Which Ten Thousands is 34,598 between? Raise your hand to answer. (Answer: 30,000 and 40,000)
18. **Say:** Let's find out if 34,598 is closer to 30,000 or 40,000
19. **Ask:** Which digit is in the Thousands place? Raise your hand to answer. (Answer: 4)
20. **Say:** To round 34,598 to the nearest 10,000, we first consider the digit in the Thousands place.
21. Underline 4.
22. **Say:** Since the number in the Thousands place is 4, which is less than 5, we round down. This means we replace the Thousands, Hundreds, Tens and ones digits with 0. And so, 34,598 rounded to the nearest 10,000 is 30,000.
23. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
24. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)
25. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)
26. **Ask:** What digit is in the Thousands place? Raise your hand to answer. (Answer: 0)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write the following numbers on the board and ask pupils to round them to the nearest 10,000:

   'a. 89,745 b. 76,778 c. 12,922 d. 40,998' (Answers: a. 90,000, b. 80,000, c. 10,000, d. 40,000)

3. Walk around the room, check pupils' work, discuss with them and assist where necessary.
4. As you walk around, ask 4 different pairs to write their answers on the board.
5. **Ask:** What digit is in the ones place? (Answer: 0)
6. **Ask:** What digit is in the Tens place? (Answer: 0)
7. **Ask:** What digit is in the Hundreds place? (Answer: 0)

Independent Practice *(8 minutes)*

1. Have pupils copy the problems into their notebooks and solve them individually.
2. Write the following numbers on the board and ask pupils to round them to the nearest 10,000:

   'a. 74,009 b. 11,290 c. 87,456 d. 55,555' (Answers: a. 70,000, b. 10,000, c. 90,000, d. 60,000)

3. Ask pupils to write their answers on the board.
4. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. Write on the board: 'Round 45,454 to the nearest 10, nearest 1,000 and nearest 10,000'. (Answers: 45,450, 45,000, 50,000)
2. **Say:** Look at all the numbers we rounded to the nearest 1,000 today.
3. **Ask:** What digit is in the ones place? Raise your hand to answer. (Answer: 0)
4. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)

5. **Ask:** What digit is in the Hundreds place? Raise your hand to answer. (Answer: 0)
6. **Ask:** What digit is in the Thousands place? Raise your hand to answer. (Answer: 0)
7. **Say:** Remember, when we round to the nearest 10,000, the digits in the Thousands, Hundreds, Tens and ones places are all 0.
8. **Say:** Good job today pupils! You learnt how to round off numbers to the nearest 10,000.

Lesson Title: Rounding Whole Numbers Up to 100,000 to the Nearest 10, 100 or 1000	**Theme:** Numbers and Numeration	
Lesson Number: M-05-009	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to round numbers to the nearest 10, 100 and 1000.	 **Teaching Aids** Cards	 **Preparation** Divide 2 A4 sheets into 6 pieces each, and cut them out. On each piece, write one of the following: 85,766, 23,094, 12,009, 50,089, 28,014, 39,495, 75,932, 93,870, 12,364, 45,321, 63,725, 79,654. Make enough so that each pupil will get at least one piece of paper.

Opening *(2 minutes)*

1. Write on the board: Round 34,588 to the nearest 10. Raise your hand to answer. (Answer: 34,590)
2. Write on the board: Round 34,588 to the nearest 1000. Raise your hand to answer. (Answer: 35,000)
3. **Ask:** What happens to the ones digit when we round a number to the nearest 10? Raise your hand to answer. (Answer: It becomes 0)
4. **Ask:** What happens when you round to the nearest 1000? (Answer: The digits in hundreds, tens and ones place all become 0.)
5. **Say**: Today you will learn how to round numbers to the nearest 10, 100 or 1000.

Introduction to the New Material *(8 minutes)*

1. Write on the board: Round 45,876 to the nearest 100.
2. Ask a pupil to read the number 45,876. Raise your hand to answer. (Answer: Forty-five thousand eight hundred and seventy-six)
3. **Say:** Now to round 45,876 to the nearest 100
4. **Ask:** Which Hundreds is 45,876 between? Raise your hand to answer. (Answer: 45,800 and 45,900)
5. **Ask:** Is 45,876 closer to 45,800 or 45,900? Raise your hand to answer. (Answer: 45,900)
6. **Say:** Let's find out.
7. **Ask:** Which digit is in the Tens place? Raise your hand to answer. (Answer: 7)
8. **Say:** To round 45,876 to the nearest 100, we first consider the digit in the Tens place.
9. Underline 7.
10. **Say:** Since the digit in the Tens place is 7, which is greater than 5, we round up. This means we replace the Tens and Ones digits with 0 and add one to the digit in the Hundreds place. And so, 45,876 rounded to the nearest 100 is 45,900
11. **Ask:** What digit is in the Ones place? Raise your hand to answer. (Answer: 0)
12. **Ask:** What digit is in the Tens place? Raise your hand to answer. (Answer: 0)

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Share the cards and ask each pair to round their numbers to the nearest 10, 100 and 1,000.

Number	Nearest 10	Nearest 100	Nearest 1000
85,766	85,770	85,800	86,000
23,094	23,090	23,100	23,000
12,009	12,010	12,000	12,000
50,089	51,190	50,100	50,000
28,014	28,010	28,000	28,000
39,495	39,500	39,500	40,000
75,932	75,930	75,900	76,000
93,870	93,870	93,900	94,000
12,364	12,360	12,400	12,000
45,321	45,320	45,300	45,000
63,725	63,730	63,700	64,000
79,654	79,660	79,700	80,000

3. Walk around the room, discuss with pupils and assist where necessary.

Independent Practice *(8 minutes)*

1. Have pupils copy the problems into their notebooks and solve them individually.
2. Write the following numbers on the board and ask pupils to round them to the nearest 10:

   a. 87,559 b. 84,398 (Answers: a. 87,560, b. 84,400)

3. Write the following numbers on the board and ask pupils to round them to the nearest 100:

   a. 30,009 b. 94,597 (Answers: a. 30,000, b. 94,600)

4. Write the following numbers on the board and ask pupils to round them to the nearest 10,000:

   a. 98,442 b. 65,744 (Answers: a. 100,000, b. 70,000)

5. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. **Ask:** What do you notice when we round numbers to the nearest 10? What pattern do you notice? Raise your hand to answer. (Answer: When we round to the nearest 10, the digits in the ones place becomes 0.)

2. **Ask:** What do you notice when we round numbers to the nearest 100? What pattern do you notice? Raise your hand to answer. (Answer: When we round to the nearest 100, the digits in the tens and ones places are all 0.)
3. **Ask:** What do you notice when we round numbers to the nearest 1,000? What pattern do you notice? Raise your hand to answer. (Answer: When we round to the nearest 1000, the digits in the Hundreds, Tens and Ones places are all 0)
4. **Ask:** What do you notice when we round numbers to the nearest 10,000? What pattern do you notice? Raise your hand to answer.
   (Answer: When we round to the nearest 10,000, the digits in the thousands, hundreds, tens and ones places are all 0.)
5. **Say:** The pattern remains the same, the only thing that changes is the number of zeros at the end of the rounded off number.
6. **Say:** Good job today pupils! You rounded off numbers to different place values.

Lesson Title: Write Numbers Up to 100,000 in Expanded Form	**Theme:** Numbers and Numeration	
Lesson Number: M-05-010	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to write numbers up to 100,000 in expanded form.	**Teaching Aids** None	**Preparation** Draw a place value chart on the right side of the board.

Opening *(2 minutes)*

1. Write on the board: Write 250 in expanded form.
   250 = (2 x 100) + (5 x 10)
   = 200 + 50

Hundreds	**Tens**	**Ones**
2	5	0

2. Write on the board: Write 4,376 in expanded form.
   4376 = (4 x 1000) + (3 x 100) + (7 x10) + (6 x 1)
   = 4000 + 300 + 70 + 6

Thousands	**Hundreds**	**Tens**	**Ones**
4	3	7	6

3. Write on the board: Write 8700 in expanded form.
   8700 = (8 x 1,000) + (7 x 100)
   = 8000 + 700

Thousands	**Hundreds**	**Tens**	**Ones**
8	7	0	0

4. **Say**: Today you will learn how to expand numbers up to 100,000.

Introduction to the New Material *(8 minutes)*

1. **Say:** We will now consider writing larger numbers in expanded form.
2. **Say:** For example, to write 65,894 in expanded form, it will be similar to writing numbers in the thousands and hundreds in expanded form.

Ten Thousands	**Thousands**	**Hundreds**	**Tens**	**Ones**
6	5	8	9	4

3. **Say:** Each place represents the number that the digit must be multiplied by. So:

   65,894 = (6 x 10,000) + (5 x 1000) + (8 x 100) + (9 x 10) + (4 x 1)
   = 60000 + 5000 + 800 + 90 + 4

4. Write: Write 37,005 in expanded form

Ten Thousands	Thousands	Hundreds	Tens	Ones
3	7	0	0	5

5. So 37,004 = (3 x 10,000) + (7 x ,000) + (5 x 1)
   = 30,000 + 7000 + 5

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. **Say:** Each person will do one of the following and explain their work to their partner.
3. Write on the board: 'Write the following numbers in expanded form':
   a. 57,449
   b. 85,000

   (Answers: a. 50,000 + 7000 + 400 + 40 + 9 b. 80,000 + 5000)

4. Write the following on the board: 'Complete the following:'
   a. 50000 + 90 + 5
   b. 40,000 + 6,000 + 700 + 80 + 6

   (Answers: a. 50,095 b. 46,786)

5. Walk around the room, discuss with them and assist where necessary.

Independent Practice *(8 minutes)*

1. Write on the board: Fill in the blanks with one of the following: <, > or =
   a. 10,000 + 5 ___ 9000 + 59 + 8
   b. 80,000 + 400 + 5 ___ 8000 +40 + 5
   c. 1,000 + 900 + 5 ___ 10,000 + 90 + 5
   d. 40,000 + 3000 + 600 +2 ___ 43,602
   e. 70,000 + 7000 + 8 ___ 77,800

   (Answers: a. >, b. >, c. <, d. =, e. <)

2. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. **Ask:** Are the following equations true or false?
   a. 80,000 + 5,000 + 400 = 85,040
   b. 30,000 + 1,000 + 100 +1 > 30,000 + 100 +10

c. 70,000 + 100 < 70,000 + 100 + 10 +1

(Answers: a. false, b. true, c. true)

2. **Say:** Good job today pupils, today you learnt how to write numbers in expanded form.

Lesson Title: Identifying Factors for Whole Numbers up to 50	**Theme:** Numbers and Numeration	
Lesson Number: M-05-011	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify factors for numbers up to 50.	 **Teaching Aids** None	 **Preparation** Write key words and their definitions on the board: Factor, product, exactly, remainder. (See below for definitions of key words)

Opening *(5 minutes)*

1. **Say:** Today you will learn how to identify factors for whole numbers up to 50.
2. Review multiplication tables from 2 to 9.

Introduction to the New Material *(8 minutes)*

1. **Say:** A 'factor' is a number that divides another number exactly with no remainder. When factors are multiplied together, they form the product (the number). For example, 2 x 3 = 6 This means that 2 and 3 are factors of 6
2. Use the definitions you wrote on the board to explain the definition of factor.
3. **Ask:** What other numbers can you multiply to get 6? Raise your hand to answer. (Answer: 1, 6)
4. **Ask:** Are there other whole numbers you can multiply to get 6? Raise your hand to answer. (Answer: No)
5. **Say:** So all the factors of 6 are 1, 2, 3 and 6
6. **Say:** How do you know that you have found all the factors of 6? Raise your hand to answer. (Answer: Because no other whole numbers multiply to give you a product of 6)
7. Write on the board: Find all the factors of 20.
   1 x 20 = 20
   2 x 10 = 20
   4 x 5 = 20
8. Wait for pupils to write the problem in their notebook and try to find the factors.
9. **Say:** So the factors of 20 are 1, 2, 4, 5, 10 and 20.
10. **Ask:** Have we found all the factors of 20? Raise your hand to answer. (Answer: Yes)
11. **Ask:** How do you know we have found all the factors? Raise your hand to answer. (Answer: We started with 1 because 1 is the lowest possible factor. We found all the pairs of numbers that you can multiply to get the product 20. When we got to 20, we stopped because 20 is the largest possible factor. You cannot divide 20 evenly by a number larger than 20)

Guided Practice *(8 minutes)*

1. Put pupils in pairs.
2. Write on the board: Find all the factors of:
   a) 40 (Answer: 1, 2, 4, 5, 8, 10, 20, 40)
   b) 27 (Answer: 1, 3, 9, 27)

c) 13 (Answer: 1, 13)
d) 28 (Answer: 1, 2, 4, 7, 14, 28)

3. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(10 minutes)*

1. Write on the board: 'Find the factors of the following:'
   a) 22 (Answer: 1, 2, 11, 22)
   b) 18 (Answer: 1, 2, 3, 6, 9, 18)
   c) 49 (Answer: 1, 7, 49)
   d) 36 (Answer: 1, 2, 3, 4, 6, 9, 12, 18, 36)
   e) 47 (Answer: 1, 47)
2. Give pupils eight minutes to complete the independent practice by themselves.
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. **Ask:** What have you noticed about factors? Raise your hand to answer.
   (Example answers: 1 is always a factor of any number, the biggest factor of any number is that number, 1 is the smallest factor of any whole number, a number should be divided by a factor with no remainder)
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Good work today! You know how to find factors of whole numbers now.

Key word definitions:

- Factor: a number that divides another number exactly with no remainder
- Product: the result when two numbers are multiplied
- Exactly: to divide a number with no remainder
- Remainder: a number that is left over when you divide

Lesson Title: Identifying Factors for Whole Numbers up to 100	**Theme:** Numbers and Numeration	
Lesson Number: M-05-012	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify factors for numbers up to 100.	 **Teaching Aids** None	 **Preparation** Write key words and their definitions on the board: Factor, remainder, product, and prime. (See below for definitions of key words)

Opening *(5 minutes)*

1. **Say:** Yesterday we looked at the factors of whole numbers less than 50. Today, we will continue that work and identify factors of whole numbers up to 100.
2. Review multiplication tables from 4 to 12.

Introduction to the New Material *(8 minutes)*

1. **Say:** Find the factors of 50
2. Give pupils 3 minutes to identify the factors.
3. **Ask** pupils to raise their hand and share the answers. Write the correct answers on the board. Complete the list of factors if pupils can't. (Answer: 1, 2, 5, 10, 25, 50)
4. **Ask:** How do you know you have found all the factors? Raise your hand to answer. (Answer: We started with 1. 1 is the lowest possible factor. We found all the pairs of factors until we got 50, which is the largest possible factor.)
5. Write on the board: Find the factors of 53
6. Give pupils 2 minutes to identify the factors.
7. **Ask** pupils to raise their hand and share the answers. Write the correct answers on the board. (Answer: 1, 53)
8. **Ask:** How do you know you have found all the factors? Raise your hand to answer. (Answer: We started with 1, which is the lowest possible factor. We found all the factor pairs until we got 53, 53 is the largest possible factor. There are no other numbers that divide 53 exactly because it is a prime number and only has two factors, one and itself (53).)
9. **Say:** We use this same process to find factors for numbers up to 100. Often there will be more factors as the numbers get larger. But there are always exceptions as we saw with 53. Let try another example.
10. Write on the board**:** Find the factors of 75
11. **Say:** Let's start with 1. 1 times 75 is 75 so those are factors. 75 can't be divided by 2 so we moved to 3. 2 times 25 is 75. Also, 75 can be divided by 5 so 5 times 15 is 75. Let's list the factors now.
12. Write**:** The factors of 75 are 1, 3, 5, 15, 25, 75
13. **Say:** You will notice that all the factors pair up to multiply and get 75

Guided Practice *(10 minutes)*

1. Put pupils in pairs.
2. Write on the board: Find all the factors of:
   a) 77 (Answer: 1, 7, 11, 77)
   b) 56 (Answer: 1, 2, 29, 58)
   c) 93 (Answer: 1, 3, 31, 93)
   d) 100 (Answer: 1, 2, 4, 5, 10, 20, 25, 50, 100)
3. **Say:** Discuss your answers with your partner.
4. Walk around the room to make sure pupils are discussing the problem.

Independent Practice *(8 minutes)*

1. Write on the board: 'Find the factors of:'
   a) 69 (Answer: 1, 3, 23, 69)
   b) 99 (Answer: 1, 3, 9, 11 33, 99)
   c) 71 (Answer: 1, 71)
   d) 72 (Answer: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72)
2. Give pupils seven minutes to complete the independent practice.
3. Ask pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. **Say:** One pupil told me that larger numbers always have more factors than smaller numbers. Let's see if the pupil is right.
2. Write on the board: 'List the factors of:'
   a) 50 (Answer: 1, 2, 5, 10, 25, 50)
   b) 71 (Answer: 1, 71)
3. **Ask:** Which number is larger? Raise your hand to answer. (Answer: 71)
4. **Ask:** Which number has more factors? Raise your hand to answer. (Answer: 50)
5. **Ask:** Is the pupil correct? Raise your hand to answer. (Answer: No)
6. **Say:** The pupil said it is **always** the case, and that is not true. Sometimes larger numbers have more factors. But sometimes smaller numbers have more factors. So the statement is false.
7. **Say:** Good work today, pupils. Now you know how to find factors of whole numbers up to 100.

Key word definitions:

- Factor: a number that divides another number exactly with no remainder
- Product: the result when two numbers are multiplied
- Remainder: a number that is left over when you divide
- Prime: a number that only has two factors, 1 and itself (the number)

Lesson Title: Identifying Factor Pairs for Whole Numbers up to 100	**Theme:** Factors and Multiples	
Lesson Number: M-05-013	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify factor pairs for whole numbers up to 100.	 **Teaching Aids** None	 **Preparation** Write key words and their definitions on the board: Factor, factor pair, product, prime. (See end of lesson for definitions of key words.)

Opening *(3 minutes)*

1. **Say:** Today you will identify factor pairs for whole numbers up to 100
2. Write the numbers 20, 77 and 16 on the board as follows:
   a. 20
   b. 77
   c. 16
3. **Say:** Let's find all the factors of each number on the board.
4. Give pupils 2 minutes to identify the factors.
5. **Ask** pupils to raise their hand and share the answers. Write the correct answers on the board.
   a. 20 (Answer: 1, 2, 4, 5, 10, 20)
   b. 77 (Answer: 1, 7, 11, 77)
   c. 16 (Answer: 1,2, 4, 8, 16)

Introduction to the New Material *(10 minutes)*

1. **Say**: A factor pair is two numbers that are multiplied to get another number, the product. Point to the number 20 and its factors on the board.
2. Use the definitions you wrote on the board to explain the definition of factor pair.
3. **Say:** For example, 1 and 20 is **one** factor pair of 20. If you multiply the number 1 and the number 20, the product is 20.
4. Write the numbers 1 and 20 below the number 20 and its factors on the board. Draw a line through the numbers 1 and 20 on the list of factors.
5. **Ask:** Are 2 and 4 factors of 20? Raise your hand to answer. (Answer: Yes.)
6. **Say:** Then, 2 and 4 are a factor pair of 20. Is that true or false? Raise your hand to answer. (Answer: False.)
7. **Say:** 2 and 4 are not a factor pair of 20. When you multiply 2 and 4 you do not get 20, you get 8.
8. **Ask:** What about 5 and 10? Are 5 and 10 a factor pair of 20? Raise your hand to answer. (Answer: No.)
9. **Say:** 5 and 10 are not a factor pair of 20. The product of 5 and 10 is 50.
   Ask: What are the other factor pairs of 20? Raise your hand to answer.
   (Answer: 2 and 10, 4 and 5)

Guided Practice *(10 minutes)*

1. Ask pupils to work in pairs.
2. Write on the board: Find all the factor pairs of the following numbers:
   a. 24 (Answer: 1 and 24, 2 and 12, 3 and 8, 4 and 6)
   b. 45 (Answer: 1 and 45, 3 and 15, 5 and 9)
   c. 80 (Answer: 1 and 80, 2 and 40, 4 and 20, 5 and 16, 8 and 10)
3. Walk around the room. Make sure pupils understand and are doing the task. Discuss with pupils and assist them if they need help.
4. **Ask** pupils to raise their hand and share the answers. Write the correct answers on the board.

Independent Practice *(8 minutes)*

1. Write on the board: Find the factor pairs of each number:
   a) 70 (Answer: 1 and 70, 2 and 35, 5 and 14)
   b) 25 (Answer: 1 and 25, 5 and 5)
   c) 71 (Answer: 1, 71)
   d) 72 (Answer: 1 and 72, 2 and 36, 3 and 24, 4 and 18, 6 and 12, 8 and 9)
2. Give pupils seven minutes to complete the independent practice.
3. Have pupils exchange their exercise books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. Write the number 23 on the board.
2. **Ask:** What are all the factor pairs of 23? Raise your hand to answer. (Answer: 1 and 23)
3. Write the factor pair below the number 23 as pupils say it.
4. Write the number 7 on the board.
5. **Ask:** What are all the factor pairs of 7? Raise your hand to answer. (Answer: 1 and 7)
6. Write the factor pair below the number 7 as pupils say it.
7. Write the number 11 on the board.
8. **Ask:** What are all the factor pairs of 11? Raise your hand to answer. (Answer: 1 and 11)
9. Write the factor pair below the number as pupils say it.
10. **Say:** What do these numbers have in common? How are they the same? Raise your hand to answer. (Answer: They each have only one factor pair.)
11. **Say:** There is a special name for numbers whose factor pairs are 1 and that number. They are called ‘prime numbers’. We will learn about these special numbers, ‘prime numbers’, later.
12. **Say:** Good work today pupils!

Key word definitions:

- Factor: a number that divides another number exactly with no remainder
- Factor Pair: two factors of a number that multiply to get the number
- Product: the result when two numbers are multiplied
- Prime: a number that only has two factors, 1 and that number

Lesson Title: Identifying Common Factors for Numbers up to 100	**Theme:** Factors and Multiples	
Lesson Number: M-05-014	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify common factors for numbers up to 100.	 **Teaching Aids** None	 **Preparation** Write key words and their definitions on the board: common factor, greatest common factor. (See below for definitions of key words.)

Opening *(3 minutes)*

1. **Say:** Today we will find common factors for numbers up to 100.
2. Write the following numbers on the board:
   a. 24 (Answer: 1, 2, 3, 4, 6, 8, 12, 24)
   b. 16 (Answer: 1,2, 4, 8, 16)
3. **Say:** Let's find all the factors of these numbers.
4. Give pupils 2 minutes to identify the factors.
5. **Ask** pupils to raise their hand and share the answers. Write the correct answers on the board. Leave the answers on the board because you will use them in the next section of the lesson.

Introduction to the New Material *(10 minutes)*

1. **Say:** Common factors refer to one or more numbers (other than 1) that are factors of at least two different numbers.
2. Write the factors of 9 (1, 3, 9) and 6 (1, 2, 3, 6) on the board.
3. **Say:** For example, 3 is a factor of 9, and 3 is also is a factor of 6. So we can say that 3 is a common factor of 6 and 9
4. Point to the numbers and their factors on the board. Circle the number to show that it is a common factor to both 6 and 9
5. **Say:** It is important that you list all the factors so you can find the common factors.
6. **Say:** Let's find the common factors of 15 and 40.
7. Write the numbers 15 and 40 on the board.
8. **Ask:** What are the factors of 15? Raise your hand to answer.
9. Write the factors next to the number 15 as pupils say them. (Answer: 1, 3, 5, 15)
10. **Ask:** What are the factors of 40? Raise your hand to answer.
11. Write the factors next to the number 40 as pupils say them. (Answer: 1, 2, 4, 5, 8, 10, 20, 40)
12. **Ask:** What are the common factors of 15 and 40? Raise your hand to answer.
13. Circle the common factors as pupils answer. (Answer: 5)
14. **Say:** Look back to the factors we listed in the opening problems for 24 and 16
15. **Ask:** What are the common factors of 24 and 16? Raise your hand to answer.
16. Circle the common factors as the pupils answer. (Answer: Factors common to 24 and 16 are 2, 4, and 8.)

17. **Ask:** Which number is the 'greatest common factor' or 24 and 16? Remember that the greatest common factor is the largest factor common to both numbers. Raise your hand to answer. (Answer: The greatest common factor is 8)

Guided Practice *(10 minutes)*

1. Ask pupils to work in pairs.
2. Write on the board: Find the common factors of the following pairs of numbers:
   a. 24 and 18 (Answer: 2, 3, and 6)
   b. 45 and 81 (Answer: 3 and 9)
   c. 63 and 98 (Answer: 7)
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.

Independent Practice *(8 minutes)*

1. Write on the board: Find the common factors of the following pairs of numbers:
   a) 69 and 27 (Answer: 3)
   b) 24 and 54 (Answers: 3, 6)
   c) 28 and 30 (Answer: 2)
   d) 30 and 6 (Answer: 2, 3, 6)
2. Give pupils seven minutes to complete the independent practice by themselves.
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. Write the numbers 9 and 99 on the board.
2. **Say**: Take 2 minutes to find all the factors of 9 and 99.
3. **Ask:** What are the common factors of 9 and 99? Raise your hand to answer.
4. Write the factors as pupils answer. (Answer: 3, 9)
5. **Ask:** Of the two common factors, which factor is the largest? Raise your hand to answer. (Answer: 9)
6. **Say:** We will learn more about greatest common factors later. Good work today! You can now find common factors of numbers up to 100.

Key word definitions:

- Common factor: one or more numbers (other than 1) that are factors of at least two different numbers
- Greatest common factor: the largest factor common to both numbers

Lesson Title: Identifying Common Multiples for 2 Whole Numbers up to 100	**Theme:** Factors and Multiples	
Lesson Number: M-05-015	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify common multiples for 2 whole numbers up to 100.	 **Teaching Aids** None	 **Preparation** Write key words and their definitions on the board: multiple, common multiples. (See below for definitions of key words.)

Opening *(5 minutes)*

1. **Say:** Today you will identify common multiples for two whole numbers up to 100.
2. **Ask** pupils to choose a number from 2 to 5
3. **Ask** pupils to take their number and multiply it by 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10.
4. **Say:** The answers you get when you multiply your number by 1, 2, 3, and so on are the 'multiples' of your number.
5. Write the following on the board: Multiples of 3
   1x3=3 2x3=6 3x3=9 3x4=12 3x5=15 3x6=18 3x7=21 3x8=24 3x9=27 3x10=30
6. **Say:** The multiples of 3 therefore are 3, 6, 9, 12, 18, 21, 24, 27 and 30.
7. Point to each multiple as you say the number.

Introduction to the New Material *(10 minutes)*

1. Write the numbers 6 and 4 on the board.
2. **Ask** pupils to multiply the 6 and 4 by 1, 2, 3, 4 up to 12 and write down their answers.
3. Give pupils 2 minutes to multiply 6 by the numbers 1 to 12.
4. **Say**: What are the multiples of 6? Raise your hand to answer.
5. Write down the answers as pupils say them. (Answer: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72)
6. **Ask** pupils to multiply the 4 by 1, 2, 3, 4 up to 12 and write down their answers.
7. Give pupils 2 minutes to multiply 4 by the numbers 1 to 12.
8. **Say**: What are the multiples of 4? Raise your hand to answer.
9. Write down the answers as pupils say them. (Answer: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48)
10. **Ask:** What numbers are the same from their answers in both sets of multiples? Raise your hand to answer. Circle the numbers 12, 24, 36 and 48 as pupils say them.
11. **Say:** These numbers are called 'common multiples'.
12. Use the definitions you wrote on the board to help explain the definition of common multiples.

Guided Practice *(8 minutes)*

1. Put pupils into pairs.
2. Write the numbers 5 and 10 on the board.
3. Tell pupils to list the multiples of 5 and 10 up to 100
4. Walk around the class. Make sure pupils understand and are doing the task.
5. **Ask:** What are the multiples of 5 and 10? Raise your hand to answer.

6. Write down the answers as pupils say them.
   (Answer: The multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100 and the multiples of 10 are 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)
7. **Say:** Circle the common multiples in your notebooks.
8. As pupils circle the common multiples in their book, do the same on the board.
   (Answer: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100)
9. Tell pupils to compare their answers to the answers on the board.

Independent Practice *(10 minutes)*

1. Write two pairs of numbers on the board:
   a) 10 and 20
   b) 15 and 25
2. **Say:** Write down the multiples of the numbers written on the board up to 100 in your notebooks.
   a) 10 and 20
      (Answer: The multiples of 10 are 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 and the multiples of 20 are 20, 40, 60, 80, 100)
   b) 15 and 25
      (Answer: The multiples of 15 are 15, 30, 45, 60, 75, 90 and the multiples of 25 are 25, 50, 75, 100)
3. **Say**: Identify the common multiples of both sets of numbers in your notebooks by circling them.
   (Answer: a) 20, 40, 60, 80, 100; b) 75)
4. Walk around the classroom. Make sure pupils understand and are doing the task. Discuss with pupils and assist them when they need help.

Closing *(2 minutes)*

1. **Say:** While pupils are at the board, check your answers with your partner.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Well done! Now you can find common multiples of two whole numbers.

Key word definitions:

- Multiple: the products you get when you multiply a number by 1, 2, 3, and so on
- Common multiples: a multiple that two or more numbers have in common

Lesson Title: Use Place Value to Add Numbers up to 100,000 Without Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-016	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to use place value to add numbers up to 100,000 without renaming.	 **Teaching Aids** None	 **Preparation** None

Opening *(2 minutes)*

1. Write the following 3-digit number on the board:
   465
2. **Say:** Let's learn how to expand this number in order to see the place value in parts. First, let's say this number out loud. Four hundred and sixty-five. We are going to break it down the way we said it aloud.
3. Write**:** 400 + 60 + 5
4. **Say:** This shows us how the number is broken down by its place value.
5. Write the following 3**-**digit number on the board and **say:** let's expand this number the same way.
   534 = 500 + 30 + 4
6. **Say:** Today you will learn how to use place value to add these numbers up to 100,000.

Introduction to the New Material *(15 minutes)*

1. **Say**: Now we will add the two numbers from the opening together using their expanded forms to see how the place value helps us understand addition.
2. Write the following on the board and **say**:
   465 + 534 = (400 + 60 + 5) + (500 + 30 + 4) = (500 + 400 + 60 + 30 + 5 + 4) = (900 + 90 + 9) = 999
3. Write the addition of the following two pairs of numbers on the board.
   3216 + 321
   72,146 + 6531
4. **Say:** First I want you to try to expand the numbers using their place value like we did in the opening. Remember to read the numbers out loud to help you expand them.
5. **Ask:** How do you expand the first problem. Raise your hand to answer.
   (Answer: 3216 + 321 = (3,000 + 200 + 10 + 6) + (300 + 20 + 1)
6. Write the answers on the board as pupils respond.
7. **Ask:** How do you combine the place values to add the numbers. Raise your hand to answer.
   (Answer: 3000 + 200 + 300 + 10 + 20 + 6 + 1= 3537)
8. Write the answers on the board as pupils respond.
9. **Say:** Now let's do the second problem.
10. Write**:** 72,146 + 6531 = (70,000 + 2000 + 100 + 40 + 6) + (6000 + 500 + 30 + 1) = (70,000 + 2000 + 6000 + 100 + 500 + 40 + 30 + 6 + 1) = 70,000 + 8000 + 600 + 70 + 7 = 78,677
11. **Say**: Check your work with the problem I just solved on the board.

Guided Practice *(5 minutes)*

1. Put pupils into pairs.
2. Write the following questions on the board: 'Expand using place value and add the following:'
    a. 43,425 + 3430 (Answer: (40,000 + 3,000 + 400 + 20 + 5) + (3,000 + 400 + 30) = (40,000 + 3,000 + 3000 + 400 + 400 + 20 + 30 + 5 = 40,000 + 6000 + 800 + 50 + 5 = 46,855)
    b. 65,017 + 3882 (Answer: (60,000 + 5,000 + 10 + 7) + (3,000 + 800 + 80 + 2) = (60,000 + 5,000 + 3000 + 800 + 10 + 80 + 2) = 60,000 + 8000 + 800 + 90 + 2 = 68,892)
3. **Say:** Solve the problem in your notebooks.
4. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
5. Invite a pupil from one group to the board to show how the group got their answer.
6. Ask pupils to compare their answers to the answer on the board.

Independent Practice *(10 minutes)*

1. Write the following questions on the board: Expand using place value and add the following:
    a. 72,054 + 4635 (Answer: (70,000 + 2000 + 50 + 4) + (4000 + 600 + 30 + 5) = (70,000 + 2,000 + 4000 + 600 + 50 + 30 + 4 + 5) = 70,000 + 6000 + 600 + 80 + 9 = 76,689)
    b. 80,566 + 6210 (Answer: (80,000 + 500 + 60 + 6) + (6000 + 200 + 10) = (80,000 + 6000 + 500 + 200 + 60 + 10 + 6) = 80,000 + 6000 + 600 + 80 + 9 = 86,689)
2. **Ask** pupils to answer the questions in their notebooks.
3. Have pupils to exchange their notebooks and check their work as you read the answers aloud.

Closing *(3 minutes)*

1. Invite a pupil who got both questions correct to come to the board and show their work.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Good work, pupils! You now know how to add numbers using place value.

Lesson Title: Use Place Value to Add Numbers up to 100,000 With Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-017	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to use place value to add numbers up to 100,000 with renaming.	 **Teaching Aids** None	 **Preparation** None

Opening *(2 minutes)*

1. Write the following number on the board: '63,465'
2. **Ask**: What are the places for each digit? Raise your hand to answer.
3. Write the following on the board:
   63,465 = 60,000 + 3000 + 400 + 60 + 5
4. **Say**: Yesterday we expanded numbers in order to see their place value and use it to add them together. Today we will continue using this method but we will also add large numbers that require renaming.
5. **Say:** Today we will learn how to use place value to add numbers up to 100,000 with renaming.

Introduction to the New Material *(10 minutes)*

1. Write the addition of the following two pairs of numbers on the board.
   15,621 + 8767
2. **Say:** Do you remember how to add the numbers using place value? First, we will expand the numbers and regroup them using their place value.
3. Write the following on the board:
   15,621 + 8767 = (10,000 + 5000 + 600 + 20 + 1) + (8000 + 700 + 60 + 7)
4. **Say**: Now we will rearrange these to regroup the place values together and then add.
   15,621 + 8767 = (10,000 + 5000 + 600 + 20 + 1) + (8000 + 700 + 60 + 7) =
   (10,000 + 5000 + 8000 + 600 + 700 + 20 + 60 + 1 + 7) =
   (10,000 + 13,000 + 1300 + 80 + 8) = (23,000 + 1300 + 80 + 8)
   (24,300 + 80 + 8) = 24,388

Guided Practice *(8 minutes)*

1. Put pupils into pairs.
2. Write the following question on the board:
   a. 6789 + 83,425 (Answer: (6000 + 700 + 80 + 9) + (80,000 + 3000 + 400 + 20 + 5) =
      (80,000 + 6000 + 3000 + 700 + 400 + 80 + 20 + 9 + 5) =
      (80,000 + 9000 + 1100 + 100 + 14) = (80,000 + 10,100 + 100 + 14) =
      (80,000 + 10,200 + 14) = 90,214
   b. 75,436 + 6295 (Answer: (70,000 + 5,000 + 400 + 30 + 6) + (6000 + 200 + 90 + 5) =
      (70,000 + 11,000 + 600 + 120 + 11) = (81,000 + 720 + 11) =

(81,000 + 720 + 11) = (81,000 + 731) = 81,731

3. Ask pupils to add the two numbers using place value and expanding. Ask them to write their work in their notebooks.
4. Ask a pupil from one group to show their work on the board.
5. Ask pupils to compare their answers to the answers on the board.

Independent Practice *(10 minutes)*

1. Write the following questions on the board:
    a. 8,928 + 9892 (Answer: (8000 + 900 + 20 + 8) + (9000 + 800 + 90 + 2) = (17,000 + 1,700 + 110 + 10) = (18,700 + 120) = 18,820
    b. 24,334 + 5479 (Answer: (20,000 + 4000 + 300 + 30 + 4) + (5000 + 400 + 70 + 9) = (20,000 + 9000 + 700 + 100 + 13) = 29,000 + 800 + 11 = 29,813
2. Ask pupils to answer the questions in their notebooks.
3. Walk around the class. Make sure pupils understand and are doing the task. Help pupils who need help.

Closing *(3 minutes)*

1. Invite a pupil who got both questions correct to come to the board and show their work.
2. **Ask:** What is the first step to using place value to add large numbers with renaming? Raise your hand to answer. (Answer: We expand the numbers using their place value.)
3. **Ask:** Then what do we do? Raise your hand to answer. (Answer: We add the expanded numbers using their place value.)
4. **Say:** Great work today! Now you can use place value to add numbers up to 100,000 with renaming.

Lesson Title: Addition of Numbers up to 100,000 Using the Vertical Method With and Without Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-018	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes**	 **Teaching Aids**	 **Preparation**
By the end of the lesson, pupils will be able to solve addition problems using the vertical method up to 100,000.	None	None

Opening *(3 minutes)*

1. **Say:** Today you will learn how to solve addition problems of numbers up to 100,000 using the vertical method with and without renaming.
2. Write the following two 4 digit numbers on the board: 2564 and 3657
3. **Say:** Add the two 4 digit numbers using the place value method we learnt yesterday.
4. Give pupils 2 minutes to complete the sum.
5. Invite multiple pupils to help you answer the question and write all the steps on the board as they answer.
6. **Say**: Raise your hand to answer. (Answer: 2000+ 3000+500+600+60+50+4+7 = 5000 + 1100+110+11 = 5000+1000+100+100+10+10+1 = 6000+200+20+1 = 6221)

Introduction to the New Material *(10 minutes)*

1. Write the following addition problem on the board: 543,216 + 254,321
2. **Say:** Write the problem vertically in your notebook. We will add the two numbers together.
3. Write the problem vertically on the board and solve from the ones place with the pupils, moving from the Ones to the Tens, Hundreds and so on.

	5	4	3	2	1	6
+	2	5	4	3	2	1
	7	9	7	5	3	7

4. **Say:** The answer is found without renaming.
5. Write the following addition problem on the board: 721,603 + 276,897
6. **Say:** Write the two numbers vertically in your notebooks. We will add them together. Write the problem vertically on the board and solve from the ones place with the pupils. Show them how to write the extra digit in the next column to the left.

	1		1	1	1		← Carry Over
	7	3	1	6	0	3	
+	1	7	6	8	9	7	
	9	0	8	5	0	0	

7. **Say:** This answer is found with renaming because the sum of the first column exceeds ten so the extra digit is carried into the next column where the tens are. The 1 is then added to the 9 to get 10 that exceeds again so we leave the 0 and carry over the 1 again. We continue this process.
8. Complete the problem and state the answer**.**
9. **Say**: The result is 908,500

Guided Practice *(10 minutes)*

1. Put pupils into pairs.
2. Write the following two questions on the board:
   456,201 + 342,756
   637,465 + 282,376
3. **Say:** Do these two addition problems using the vertical method. Write the problems and the answers in your notebooks.
4. Invite a pupil from one group to show their work on the board.
5. **Say:** While the pupils are completing the problem on the board, check each of your steps to compare your answer to those on the board.
   Answers:

$$\begin{array}{cccccc} & 4 & 5 & 6 & 2 & 0 & 1 \\ + & 3 & 4 & 2 & 7 & 5 & 6 \\ \hline & 7 & 9 & 8 & 9 & 5 & 7 \end{array}$$

$$\begin{array}{cccccc} & 1 & & & 1 & 1 & \\ & 6 & 3 & 7 & 4 & 6 & 5 \\ + & 2 & 8 & 2 & 3 & 7 & 6 \\ \hline & 9 & 1 & 9 & 8 & 4 & 1 \end{array}$$

← Carry Over

Independent Practice *(10 minutes)*

1. Write the following questions on the board:
   766,542 + 651,992
   544,839 + 811,256
2. **Say:** Write the problems vertically in your notebook and solve them.
3. Walk around the class. Make sure pupils understand and are doing the task. Check their answers and assist pupils who need help.

Closing *(2 minutes)*

1. **Ask**: What is important to remember when solving these addition problems? Raise your hand to answer. (Example answers: you must be careful to carry over, you must line up the numbers right)

2. **Ask:** Are there any questions?
3. Answer any questions the pupils have.
4. **Say:** Well done! You have solved addition problems using the vertical method very well today.

Lesson Title: Using Place Value to Subtract Numbers up to 100,000 Without Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-019	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to use place value to subtract numbers up to 100,000 without renaming.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. Write the following number on the board: Expand the following two numbers:
   a. 63,765 (Answer: 63,765 = 60,000 + 3000 + 700 + 60 + 5)
   b. 2663 (Answer: 2663 = 2000 + 600 + 60 + 3)
2. **Say**: Yesterday you used the method of expanding numbers to add them together. Today you will learn how to use place value to subtract numbers up to 100,000 without renaming.

Introduction to the New Material *(15 minutes)*

1. Write the following problem on the board:
   63,765 – 2633 = (60,000 + 3000 + 700 + 60 + 5) – (2,000 + 600 + 60 + 3)
2. **Say**: Now we will rearrange the numbers by place value to help subtract them.
3. **Say:** Write the subtraction problem in your notebook. Now, let's use the method of expanding to subtract these two numbers. Notice that they are the same numbers we expanded in the opening.
4. Write**:**
   63,765 – 2663 = (60,000 + 3000 + 700 + 60 + 5) – (2000 + 600 + 60 + 3) =
   (60,000) + (3000 – 2000) + (700 – 600) + (60 – 60) + (5 – 3) =
   60,000 + 1000 + 100 + 0 + 2 =
   61,102
5. Write the following problem on the board:
   7956 – 4531
6. **Say:** Let's do that again for this problem. Let's start with expanding the numbers and then use the place value to subtract.
7. Write**:**
   7,956 – 4531 = (7000 + 900 + 50 + 6) – (4000 + 500 + 30 + 1) =
   (7000 – 4,000) + (900 – 500) + (50 – 30) + (6 – 1) =
   3000 + 400 + 20 + 5
   3425
8. **Say:** This is subtraction without renaming using the expanded form.

Guided Practice *(5 minutes)*

1. Put pupils in pairs.

2. Write the following problem on the board: Subtract the following numbers using their place value by expanding:
    a. 43,172 – 2130 (Answer: (40,000 + 3000 + 100 + 70 + 2) – (2,000 + 100 + 30) = 40,000 + (3,000 – 2000) + (100 – 100) + (70 – 30) + 2 = 40,000 + 1000 + 0 + 40 + 2 = 41,042
    b. 15,814 – 13,812 (Answer: (10,000 + 5000 + 800 + 10 + 4) – (10,000 + 3,000 + 800 + 10 + 2) = (10,000 – 10,000) + (5000 – 3000) + (800 – 800) + (10 – 10) + (4 – 2) = 0 + 2000 + 0 + 0 + 2 = 2002
3. Invite a pupil from one group to show their work on the board.
4. Ask pupils to compare their answers to the answer on the board.

Independent Practice *(10 minutes)*

1. Write the following problems on the board:
    a. 43,056 – 1032 (Answer: (40,000 + 3000 + 50 + 6) – (1000 + 30 + 2) = 40,000 + (3000 – 1000) + (50 – 30) – (6 – 2) = 40,000 + 2000 + 20 + 4 = 42,024
    b. 89,725 – 602 (Answer: (80,000 + 9000 + 700 + 20 + 5) – (600 + 2) = 80,000 + 9000 + (700 – 600) + 20 + (5 – 2) = 80,000 + 9000 + 100 + 20 + 3 = 89,123
2. **Say:** Solve these problems in your notebook. Work on your own.
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist if pupils need help.

Closing *(2 minutes)*

1. Invite a pupil who got both questions correct to come show their work on the board.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Well done! Now you can use place value to subtract numbers.

Lesson Title: Using Place Value to Subtract Numbers up to 100,000 With Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-020	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to use place value to subtract numbers up to 100,000 with renaming.	 **Teaching Aids** None	 **Preparation** None

Opening *(2 minutes)*

1. Write the following number on the board:
   64,769 – 3568 (Answer: (60,000 + 4000 + 700 + 60 + 9) – (3,000 + 500 + 60 + 8) =
   60,000 + (4,000 – 3000) + (700 – 500) + (60 – 60) + (9 – 8) =
   60,000 + 1000 + 200 + 0 + 1 = 61,201
2. **Say**: Expand the two numbers and subtract using the expanded forms.
3. **Say:** Today you will learn how to use place value to subtract numbers up to 100,000 with renaming.

Introduction to the New Material *(15 minutes)*

1. Write the following problem on the board: 7652 – 6565
2. **Say:** Let's expand the numbers using place value. Some numbers are larger than the number they are taken from. So we have to 'borrow' from the next place. We call this 'subtraction with renaming'.
3. **Say** and write: Expand the two numbers:
   7652 – 6565 = (Answer: (7000 + 600 + 50 + 2) – (6000 + 500 + 60 + 5)
4. **Say**: Now we will subtract using the expanded version but we will need to borrow from the next place value to the left. Let's do this together.
5. Write and **say** the following: We will use place value to subtract the expanded numbers using renaming.
   7652 – 6565 = (7000 + 600 + 50 + 2) – (6000 + 500 + 60 + 5) = (7000 – 6000) + (600 – 500) + (50 – 60) + (2 – 5) = 1,000 + 100 + (50 – 60) + (2 – 5) = 1,000 + (150 – 60) + (2- 5) = 1000 + 90 + (2 – 5) = 1000 + 80 + (12 – 5) = 1000 + 80 + 7 = 1,087
6. **Say:** Let's do that again. Now we will solve this problem with renaming.
   56,823 – 42,734 = (50,000 + 6000 + 800 + 20 + 3) – (40,000 + 2000 + 700 + 30 + 4) =
   (50,000 – 40,000) + (6000 – 2000) + (800 – 700) + (20 – 30) + (3 – 4) =
   10,000 + 4000 + 100 + (20 – 30) + (3 – 4) =
   10,000 + 4000 + (120 – 30) + (3 – 4) = 10,000 + 4000 + 90 + (3 – 4) =
   10,000 + 4000 + 80 + (13 – 4) = 10,000 + 4000 + 80 + 9 = 14,089

Guided Practice *(5 minutes)*

1. Put pupils into pairs.

2. Write the following problem on the board:
   73,598 – 67,687 (Answer: (70,000 + 3000 + 500 + 90 + 8) – (60,000 + 7000 + 600 + 80 + 7) =
   (70,000 – 60,000) + (3000 – 7,000) + (500 – 600) + (90 – 80) + (8 – 7) =
   10,000 + (3000 – 7,000) + (500 – 600) + 10 + 1 =
   (13,000 – 7000) + (500 – 600) + 10 + 1 = 6000 + (500 – 600) + 10 + 1 =
   5,000 + (1500 – 600) + 10 + 1 = 5000 + 900 + 10 + 1 **=** 5,911
3. **Say:** Subtract the two numbers using place value, as we have done on the board. Write your answers in your notebooks.
4. Invite a pupil from a group to show their work on the board.
5. Ask pupils to compare their answers to the answer on the board.

Independent Practice *(10 minutes)*

1. Write the following problems on the board:
   a. 35,261 – 18,740 (Answer: 16,521)
   b. 83,530 – 35,527 (Answer: 48,003)
2. **Say:** Solve these problems in your notebook.
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist if pupils need help.

Closing *(3 minutes)*

1. Invite a pupil who got both questions correct to come show their work on the board.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Good work today! Now you can use place value to subtract numbers with renaming. Well done!

Lesson Title: Subtraction of Numbers up to 100,0000 Using the Vertical Method With and Without Renaming	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-021	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to solve subtraction problems for numbers up to 100,000 using the vertical method.	 **Teaching Aids** None	 **Preparation** Define key vocabulary words: Subtraction, minus, take away, digits and vertical method.(See definitions to key vocabulary below.)

Opening *(5 minutes)*

1. **Say:** Today we are going to learn to solve subtraction problems for numbers up to 100,000 using the vertical method.
2. Write the following problem on the board:

$$\begin{array}{rr} & 54,653 \\ + & 6,549 \\ \hline & \end{array}$$

3. **Say:** Solve this addition problem using the vertical method like we did this week. Remember to carry over the extra digit to the column to the left. I'll show you the first step.
4. Complete the first step and then let pupils finish the problem on their own. Raise your hand to answer. (Answer: 61,202)
5. **Say**: In addition problems, we carry over the extra place value to the column to the left. In subtraction problems that need renaming, we will borrow or take from the column to the left to subtract.

Introduction to the New Material *(10 minutes)*

1. **Ask:** What does 'subtraction' mean? Raise your hand to answer. (Answers: Take away, make less, minus, reduce)
2. **Say:** When you subtract numbers using the vertical method, you set up the problem by putting the number you are taking away on the second row, next to the minus sign.
3. Write the following problems on the board:

a) $\begin{array}{rr} & 2349 \\ - & 18 \\ \hline & \end{array}$ b) $\begin{array}{rr} & 6578 \\ - & 456 \\ \hline & \end{array}$ c) $\begin{array}{rr} & 346 \\ - & 59 \\ \hline & \end{array}$

4. Demonstrate how to solve the problems. Explain how to 'borrow' from the next place value if the number being subtracted is larger than the number on top. (Answers: a) 2331 b) 6122 c) 287)
5. Show pupils that they can check their answers by adding their answer and the smaller value. If the sum is equal to the bigger number, then their answer is correct.

6. Show pupils how to rewrite the following problems in vertical form. Solve the problems with the pupils.
   a) 7896 – 99 = (Answer: 7797)
   b) 6457 – 989 = (Answer: 5468)
   c) 748 – 29 = (Answer: 719)
   d) 5346 – 23 = (Answer: 5323)

Guided Practice *(7 minutes)*

1. Put pupils into pairs.
2. **Say:** Each pupil on the left must come up with a 4 or 5 digit number. Write the number in your notebooks. The pupil on the right must come up with a smaller 4 or 5 digit number. Write the smaller number below the first number in your notebooks. Now, subtract the smaller number from the larger number using the vertical method we just learnt.
3. Let pupils work out the answers using the vertical method. Walk around the class. Make sure pupils understand and are doing the task. If pupils finish, ask them to make another problem.
4. Pupils come up with as many four and three digit numbers as possible.
5. Ask higher ability pupils to use higher numbers, like the ones below:

a)
```
  1 0 0 0 0 0
-     8 9 4 5 7
-------------
    1 0 5 4 3
```

b)
```
  4 5 6 7 7
-     6 8 7 9
-------------
  3 8 7 9 8
```

c)
```
  3 4 5 6 7
-       9 7 6
-------------
  3 3 5 9 1
```

Independent Practice *(8 minutes)*

1. Write the following problems on the board:
   a) 4568 – 999 = (Answer: 3569)
   b) 8765 – 987 = (Answer: 7778)
   c) 8754 – 19 = (Answer: 8735)
   d) 6543 – 877 = (Answer: 5666)
   e) 64827 – 987 = (Answer: 63840)
   f) 8764 – 99 = (Answer: 8665)
2. **Say:** Write these problems in your notebook. Solve them on your own using the vertical method.
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist pupils who need help.

Closing *(5 minutes)*

1. Invite 6 pupils to write their work on the board. Give 1 pupil each problem to solve on the board.
2. Ask pupils to compare their answers with the answers on the board.
3. **Ask:** Are there any questions?
4. Answer any questions the pupils have.
5. **Say:** Good work, pupils! Now you can subtract using the vertical method.

Lesson Title: Finding Missing Addends	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-022	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to find the missing addends.	**Teaching Aids** None	**Preparation** Define key vocabulary word: Addend. (See below for definitions of key vocabulary.)

Opening *(5 minutes)*

1. **Say:** Today you will learn how to find the missing addends in an addition problem.
2. **Ask** pupils to add the following numbers:
3. Write: Add the following:
   a. 378 + 457 =
   b. 673 + 134 =
   c. 563 + 245 =
4. Give pupils 4 minutes to solve the problems.
5. **Say**: Raise your hand to answer. (Answer: a) 835 b) 807 c) 808)

Introduction to the New Material *(7 minutes)*

1. **Say:** If you are missing an addend, which is one number in an addition problem, you must use subtraction to find the missing number.
2. Write 5 + ☐
3. **Say:** To find the missing addend, take the total (15) and subtract the addend you know (5). So let's find the answer to 15 – 5. Raise your hand to answer. (Answer: 10)
4. **Ask** pupils to work in pairs to find the missing addend in the following:
   a) 3 + ☐ = 14

   b) 8 + ☐ = 19

   c) 12 + ☐ = 30

5. Write**:**
   a) 14 – 3 = ☐ b) 9 – 8 = ☐ c) 30 – 12 = ☐
6. Raise your hand to answer. (Answers: a) 19 b) 11 c) 18)

Guided Practice *(10 minutes)*

1. Write the following problems on the board:

a) 3 7 8 9 + ☐ = 5 0 3 4

b) 6 7 8 0 + ☐ = 1 2 0 5 8

c) 6 8 9 + ☐ = 1 4 0 0

2. **Say:** Let's find the missing addend in the problems on the board by rewriting the problem using subtraction.
3. Demonstrate how to find the missing addend by subtracting the answer from the addend you know. For example, in the first problem, 5034 – 3789
4. **Say:** Set up the problem using the vertical method.
5. Write**:**

a) 5 0 3 4 - 3 7 8 9 = 1 2 4 5

6. Ask pupils to complete the remaining 5 problems with their partner.
7. Walk around the class. Make sure pupils understand and doing the task. Check pupils' answers and assist if pupils need help.
8. **Say**: Raise your hand to answer. (Answers: a) 1245 b) 5278 c) 711)

Independent Practice *(8 minutes)*

1. Write the following problems on the board:

a) 78, 654 + _____ = 139, 910
b) 54,696 + _____= 106, 488
c) 82,433 + _____ = 174,973
d) 567 + _____ = 1000

2. **Say:** Solve these problems in your notebook using the vertical method and subtraction. (Answers: a) 61256 b) 51792 c) 92540 d) 433)
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist if pupils need help.

Closing *(5 minutes)*

1. Write the following problems on the board:

a)
```
  5 4 6
+ [   ]
-------
  7 6 5
```

b)
```
  3 6 7 8
+ [     ]
---------
  5 4 5 7
```

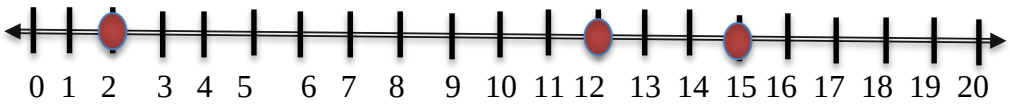
2. Invite pupils to the board to find the missing addend in the questions on the board. (Answers: a) 219 b) 1779 c) 2965)
3. **Ask:** Are there any questions?
4. Answer any questions pupils have.
5. **Say:** Well done! You have found the missing addends.

Lesson Title: Compare 2 Quantities Using Greater Than, Less Than and Equal To Signs	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-023	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to compare and order 2 quantities using >, < and = signs.	**Teaching Aids** None	**Preparation** Draw a number line on the board for the opening example as seen below.

Opening *(5 minutes)*

1. **Say**: Today you will learn how to compare two quantities using greater than, less than and equal to signs.
2. **Ask** pupils to draw a number line and label their number line from 1-20 and represent the following numbers on their number lines.
   a) 15
   b) 12
   c) 2



3. **Ask:** Which number is the largest? Raise your hand to answer. (Answer: 15)
4. **Say:** You know it is the largest because it is the farthest to the right on the number line.
5. **Say:** Which number is the smallest using this definition? Raise your hand to answer. (Answer: 2)
6. Write the following on the board: 15 is greater than 2.
7. **Say**: We can use symbols to represent this comparison. Today we will learn how to do this.

Introduction to the New Material *(12 minutes)*

1. Write the following on the board:
   Greater than >
   Less than <
   Equal to =
2. **Say**: These symbols help us compare two numbers or quantities to determine if one is larger or smaller than the other or if they are equal. In the opening, we found that 15 was the largest number in the set and 2 was the smallest number in the set. We can use the symbol to represent this as follows:
3. Write: 15 > 2 **Say:** 15 is greater than 2
4. **Say:** If we write the inequality like this 2 ____ 15, than we use the symbol 2 < 15 because 2 is less than 15 if you read from the left to the right.
5. **Say:** We used a number line to determine this but we can also use place value to help us determine which number is larger or smaller.
6. Write**:** 235, 435, 335, 235, 445 and 375 or the board.
7. **Say:** Copy these numbers into your notebook. Look at 235 and 435. In the hundreds place, the larger digit is 4, thus 435 is the greater number. If the hundreds place is the same, move to the tens or ones to find which is bigger.
8. Point to and/or underline the 2 and the 4 when you explain this. Circle the bigger number.
9. Write**:** 435 ____ 235. **Say** that we will use the symbol to represent this. The symbol must 'open' towards the bigger number. Thus we write 435 > 235 This means that 435 is greater than 235

10. Write**:**
    a) 235 ____ 335
    b) 335 ____ 235
    c) 445 ____ 435
    d) 235 ____ 235
    e) 435 ____ 475
11. **Say:** Fill in the blank with the appropriate sign to represent which number is greater or less than the other or the equal sign is they are equal to each other. Create one more comparison using the number set I gave you that is different to these.
12. Give pupils 4 minutes to complete this**.** Invite pupils to the board to write in the appropriate symbol to answer the question.
13. **Say:** Raise your hand to answer. (Answer: a) < b) > c) > d) = <)

Guided Practice *(5 minutes)*

1. **Ask** pupils to work with a partner.
2. Write the following questions on the board and ask pupils to copy into their books. Complete the following with =, < or >
    a) 232 __ 132
    b) 567 __ 568
    c) 3453 __ 3567
    d) 1367 __ 1367
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist if pupils need help.
4. **Say**: Raise your hand to answer. (Answer: a) > b) < c) < d) =)

Independent Practice *(8 minutes)*

1. Write the following problems on the board:
    a) 3564 __ 8563 (Answer: <)
    b) 562 __ 212 (Answer: >)
    c) 3956 __ 3256 (Answer: >)
    d) 8178 __ 1455 (Answer: >)
    e) 3867 __ 3867 (Answer: =)
2. Ask pupils to compare the following quantities using =, < and >
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist if pupils need help.

Closing *(5 minutes)*

1. Write the following comparisons on the board. Ask pupils to work in pairs and complete the inequalities with =, < or >
    a) 125 __ 156 (Answer: <)
    b) 358 __ 356 (Answer: >)

c) 9050 __ 1050 (Answer: >)

d) 55 __ 556 (Answer: <)

2. Invite 4 pupils to write their answers on the board.
3. Ask pupils to compare their answers to the answers on the board.
4. **Say:** Good work, class! You have learnt about using the <, > and = signs to compare two numbers.

Lesson Title: Story Problems Using Addition and Subtraction	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-024	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to solve story problems using addition and subtraction.	 **Teaching Aids** None	 **Preparation** Write the story problems for the guided practice and independent practice on the board.

Opening *(5 minutes)*

1. **Say:** Today you will learn how to solve story problems using addition and subtraction.
2. Review the vocabulary words 'sum', 'plus', 'total', 'difference', 'minus' and 'from' with the pupils.
3. Write the following on the board:
   a) A pupil had 8 pencils at the beginning of class, he gave 4 pencils to other pupils, how many does he have left?
   b) One office had 8 workers and they hired 4 more, how many workers are there now in total?
4. **Ask:** What operation is each problem asking you to use? Raise your hand to answer.
   (Answer: a) subtraction b) addition)

Introduction to the New Material *(8 minutes)*

1. Write the following story problems on the board:
   a) I have 52 red books and 89 green books. How many books do I have in total?
   b) There are 35 pupils in Class 5. 20 of them are girls, how many are boys?
2. **Ask:** What operation will you use to find the total number of books in problem 1? Raise your hand to answer. (Example answers: addition, sum, plus, total)
3. **Say**: Let's add the two numbers together using the expanded form or vertical method. Write the problem on the board 52 + 89 on the board.
4. **Ask** pupils to answer the problem. Give them 1 minute to solve. Raise your hand to answer.
   (Answer: 52 + 89 = 141, there are 141 books total).
5. **Ask**: What operation will you use to find the number of boys in Class 5 in the second problem? Raise your hand to answer. (Example answers: difference, minus)
6. **Say**: Let's subtract the two numbers. Write the problem 35 – 20 on the board.
7. Ask pupils to answer the problem. Give them 1 minute to solve. Raise your hand to answer.
   (Answer: 35 – 20 = 15, there are 15 boys).

Guided Practice *(7 minutes)*

1. Write the following questions on the board and ask pupils to copy them into their notebooks.
   a) In a small school, there are 138 girls and 59 boys. How many children are there in total?
   (Answer: 138 + 59 = 197 children)
   b) As a teacher, I buy 91 pens and 99 pencils a year. How many pens and pencils do I buy?
   (Answer: 91 + 99 = 190 pens and pencils)

c) There are two schools with a total population of 5698 pupils. If the population of one of the schools is 3917, what is the population of the other school? (Answer: 5698 – 3917 = 1781 pupils)

2. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist pupils who need help.
3. Invite pupils to show their work on the board.
4. Ask pupils to compare their answers to the answer on the board while the other pupils are up at the board.

Independent Practice *(10 minutes)*

1. Write the following questions but *not* the answers on the board:
   a) In a long jump competition, George jumped 235 cm. The winner jumped 278 cm. How much further was the winning jump? (Answer: 278 – 235 = 43cm)
   b) In a school election, a total of 3,689 pupils out of 4005 pupils voted for the candidates. How many pupils did not vote? (Answer: 4005 – 3689 = 316 pupils did not vote)
   c) 158 children are watching a football match. 27 more children come to watch. How many children are now watching the match? (Answer: 158 + 27 = 185 children)
   d) In Year 3 there were 357 pupils. In Year 4 there were 337 pupils. In Year 5 there were 279 pupils. In Year 6 there were 299 pupils. How many pupils were there altogether? (Answer: 357 + 337 + 279 = 973 pupils)
   e) Three schools went to watch a film. There were 1250 pupils from School A, 236 pupils from School B and 394 pupils from School C. How many pupils went to watch the film? (Answer: 1,250 + 236 + 394 = 1880 pupils)
   f) A plane flew 2675 miles of a 6000-mile long journey, before stopping to refuel. How much further does it have to go? (Answer: 3325 miles left)
2. Tell pupils to copy the questions into their notebooks if time permits.
3. Walk around the class. Make sure pupils understand and are doing the task. Check pupils' answers and assist pupils who need help.
4. Have pupils to exchange their books and check their work while you read the answers aloud or write them on the board.

Closing *(5 minutes)*

1. Write the following question on the board.
   a. There were 6975 trees on an island. A storm blew down 2698 of them. How many were left?
2. Ask pupils to write the steps they need to take to answer the question.
   (Answer: You set up a subtraction problem and solve using expansion or the vertical method: 6975 – 2698 = 4277 trees left)
3. Invite one pupil to the board to explain the process and answer the question.
4. **Say**: Make corrections to your steps as the pupil explains his/her answer. Check your answer.
5. **Ask:** Are there any questions?
6. Answer any questions pupils have.
7. **Say:** Well done, pupils! You have solved a lot of story problems today.

Lesson Title: More Complex Word Problems Using Both Addition and Subtraction	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-025	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to solve complex word problems using both addition and subtraction.	 **Teaching Aids** None	 **Preparation** Write the story problems for all sections on the board before class begins.

Opening *(5 minutes)*

1. Write the following word problems on the board. Ask pupils to work in pairs to solve them.
   d) At a football match, there are 567 fans who are adults and children. 342 of them are adults. How many are children?
   e) In a market, 75 women sell tomatoes, 54 women sell garden eggs and 80 women sell bananas. How many women are in the market altogether? (Answer: 75 + 54+ 80 = 209)
2. Raise your hand to answer the first problem. (Answer: 567 – 342 = 225)
3. **Ask**: What is different about the second problem? Raise your hand to answer. (Example answers: there are three numbers; it is addition)
4. **Say:** Today you will learn how to solve more complex word problems using both addition and subtraction.

Introduction to the New Material *(8 minutes)*

1. Write the following story problems but *not* the answers on the board.
   a) A man planted 400 seeds. 200 of the seeds grew into flowers on the third day, and 46 seeds grew into flowers on the fourth day. How many of the seeds didn't grow? (Answer: 400 – (200 + 46) = 400 – 246 = 154).
   b) If I need 850 g of flour to make 12 cakes, how much flour will I need to make 24 cakes? (Answer: Since 24 cakes = 12 cakes + 12 cakes, you will need 850g + 850g = 1700 g of flour).
   c) If 95 children have school meals on Monday, and there a 25 fewer children having school meals on Tuesday, how many are having school food on Tuesday? (Answer: 25 fewer is 95 - 25 = 70)
2. **Say:** In your pair, read these problems. Write down a mathematical expression that will help you solve the story problem.
3. **Say:** In the first problem, there are two numbers that we need to add first, the amount of flowers that grew on the third day and fourth day.
4. Write**:** (200 + 46) = 246
5. **Say:** Then we must subtract that from the total number of seeds planted to find the total that did not grow.
6. Write**:** 400 – (200 + 46) = 400 – 246 = 154 seeds that didn't grow.
7. **Say:** Now complete the other two problems.
8. Give pupils 3 minutes to complete the problems.
9. Invite three pupils to come to the board and write their mathematical expressions and answers.

10. **Ask** pupils to compare their answers to the answer on the board.

Guided Practice *(9 minutes)*

1. Write the following questions on the board and ask pupils to copy them into their notebooks.
    a) There are 130 books on the top shelf. I removed 20 of the books at break time. I add 12 books at lunchtime. At home time I take 2 books. How many books are left on the shelf? (Answer: 130 – 20 + 12 – 2 = 142 – 22 = 120 books)
    b) I bought a pack of 30 biscuits. I ate 12 of them on Monday. On Tuesday I ate half of the number I ate on Monday. How many biscuits do I have left? (Answer: 30 – 12 – 6 = 30 – 18 = 12 biscuits)
    c) Arthur baked 115 muffins, which was 17 more muffins than Ann. How many muffins did Ann bake? (Answer: 115 – 17 = 98. Ann baked 98 muffins.)
2. **Say:** In your pair, write a mathematical expression and solve the three story problems.
3. Walk around the class. Make sure pupils understand and are doing the task.
4. Invite three pupils to come to the board and write their mathematical expressions and answers.
5. Tell pupils to compare their answers to the answer on the board.

Independent Practice *(8 minutes)*

1. Write the following questions on the board and ask pupils to solve them on their own.
    a) Three pupils John, Joseph, and Ann took a test. If Ann scored 10% higher than Joseph, and John scored 69% which was 6% less than Ann's score, what was Joseph's score? (Answer: Ann's score is 69% + 6% = 75%. Since Ann scored 10% higher than Joseph, then Joseph's score is 75% – 10% = 65%).
    b) In a certain class, 10 pupils come to school by car, 12 pupils come by bus and the rest walk. If the number of pupils who walk to school is 5 more than those who come by car, how many pupils are in the class? (Answer: 10 + 12 + 15 = 27 pupils)
    c) If John has 158 toy cars, Tom has 278 toy cars, and George has 25 fewer toys than John, how many toy cars do they have altogether? (Answer: George has 158-25 = 133. Therefore, the total is 158+278+133 = 569 cars)
2. Walk around the class. Make sure pupils understand and are doing the task.
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. Write the following questions on the board. Ask pupils to try the following questions.
    a) There are 35 people in the swimming pool at 9 o'clock. By 10 o'clock 18 people leave and half the number who left earlier came back to swim at 11 o'clock. How many people are there now? (Answer: 35 – 18 + 9 = 26 people)
2. Ask pupils to write the steps they need to solve the problem. Then solve the problem.

3. Invite a pupil to write and explain their answer at the board while others check their work.
4. **Say:** Good job, pupils! You have solved a lot of complex story problems today.

Lesson Title: Using the Metric System for Measuring Length	**Theme:** Measurement and Estimation	
Lesson Number: M-05-026	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to draw the table of the metric system for length using place value chart.	 **Teaching Aids** 1. Ruler (See ruler below attached to the end of the worksheet.) 2. Worksheet (See below for worksheet.)	 **Preparation** Draw the place value chart from the guided practice on the board.

Opening *(4 minutes)*

1. **Say:** Today you will learn how to draw the table of the metric system for length using a place value chart.
2. Write the following on the board:
   a) 10 x 100 =
   b) 1000 ÷ 10 =
   c) 100 ÷ 10 =
   d) 100 x 1000 =
3. **Say:** We are going to solve these problems that involve multiples of 10. When you multiply these numbers, you keep the 1 and add the zeroes to find the new answer. For a) you get 1 plus 3 zeroes to equal 1000.
4. **Say:** When you divide multiples of ten, you keep the one and subtract the zeroes to find the answer. For b) you get 1 and 3 minus 1 to equal 100
5. **Say**: Complete the last two problems using the same method.
6. **Say**: These calculations will help us understand how to convert numbers using the metric system.

Introduction to the New Material *(8 minutes)*

1. **Say:** We can measure many things around us using a ruler. Look round the class. What can we measure? Raise your hand to answer. (Example answers: Books, pencils, erasers, tables, desks)
2. **Ask:** What can you use to measure these things? Raise your hand to answer. (Example answers: Rulers; tape measures)
3. Give them a few minutes to use their rulers to measure two items around them. Show pupils how to place the ruler accurately on the items to be measured.
4. **Say:** Today we are going to learn about the metric system. The metric system is used all over the world. It is important to measure things in the right units. The length of an exercise book and your desk, for example, can be measured in centimetres, which you can see on your ruler.
5. Let's convert the centimetres to millimetres using the place value chart on the board.
6. **Say**: Copy the place value chart into your notebooks from the chart on the board.
7. **Say**: Your book is 30 centimetres long, the chart says that 1 centimetre is 10 millimetres, so multiply 30 cm x 10 to find that the book is 300 millimetres in length.

Guided Practice *(10 minutes)*

1. Write the table below on the board and have pupils to copy it into their notebooks.

10 millimetres (mm)=	1 centimetre
10 centimetres (cm)=	1 decimetre (dm) = 100 millimetres
100 centimetres =	1 metre (m) = 1000 millimetres
1000 metres =	1 kilometre (km)

2. **Say:** This chart shows the measure of lengths in different 'units'. Common units are centimetres, millimetres, metres and kilometres. Units can be converted from one into the other. For instance, we can convert units from centimetres to metres if we know that 100 centimetres are equal to I metre. So if we have to convert 300 centimetres to metres it will be 300 divided by 100, which will give us 3 metres. What about converting from metres to centimetres? Raise your hand to answer.
3. **Say:** If we have 4 metres, how many centimetres do we have? We know that 100 centimetres are equal to I metre, therefore 4 metres will be 4 multiplied by 100, or 400 centimetres.
4. **Say:** We know the centimetre is smaller because 100 cm makes just 1 metre. So when you are changing into the smaller unit, like metre into centimetres, you multiply. When you are changing to the bigger unit, like centimetre to metre, you divide.
5. Write the following charts but *not* answers on the board. Work through the examples and fill in the blanks with the pupils.

Centimetres	**Metres**	
200		(Answer: 2 m)
	3	(Answer: 300 cm)
	5	(Answer: 500 cm)
600		(Answer: 6 m)
700		(Answer: 7 m)

Centimetres	**Millimetres**	
	20	(Answer: 2 cm)
8		(Answer: 80 mm)
	50	(Answer: 5 cm)
3		(Answer: 30 mm)
	40	(Answer: 4 cm)

Independent Practice *(8 minutes)*

1. Every child should have a ruler for this activity and the accompanying worksheet (see below). Guide them to first measure the length of each line using their rulers and record their answer in centimetres. Then have them convert to the indicated unit of measure.
2. Walk around the class. Make sure pupils understand and are doing the task.

Closing *(5 minutes)*

1. Invite pupils to provide their answers and compare with the converted length.
2. **Ask:** What have you learned today? Raise hand to answer. (Example answers: how to measure using a ruler, how to convert centimetres to other metric units)

3. **Say:** Well done, pupils! You have learnt a lot about measurement.

NAME: _____ DATE: _____

M-05-026: MEASUREMENT WORKSHEET

1.

LENGTH IN CM = *LENGTH IN MM =*

2.

LENGTH IN CM = *LENGTH IN MM =*

3.

LENGTH IN CM = *LENGTH IN MM =*

4.

LENGTH IN CM = *LENGTH IN M =*

5.

LENGTH IN CM= *LENGTH IN KM=*

6.

LENGTH IN CM= *LENGTH IN MM=*

7.

LENGTH IN CM= *LENGTH IN M=*

8.

LENGTH IN CM= *LENGTH IN KM=*

(Note to teacher: This ruler is to scale and can be cut and used if rulers are not available.)

Lesson Title: Converting Between Metres, Centimetres and Millimetres	**Theme:** Measurement and Estimation	
Lesson Number: M-05-027	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to convert between metres, centimetres and millimetres using place value chart.	 **Teaching Aids** Rulers (See below for a ruler that is to scale that can be used if rulers are not available.)	 **Preparation** Draw a metric conversion table on the board.

Opening *(5 minutes)*

1. **Say**: Today you will learn how to convert between metres, centimetres and millimetres using a place value chart
2. **Say:** Use your ruler to measure the length of your desk and record your answer in your notebook.
3. **Say:** Measure the width of your desk and record your answer in your notebook.
4. **Ask:** What is the unit of measure you used for your measurement? Raise your hand to answer. (Answer: centimetres)

Introduction to the New Material *(5 minutes)*

1. Ask pupils to work in pairs.
2. **Say:** Use your ruler to find how many millimetres makes a centimetre. (Answer: 10mm makes 1cm.)
3. **Ask:** How many millimetres are in 5 centimetres? Raise your have to answer. (Answer: 50 cm)
4. **Ask:** How many metres is 100cm? Raise your hand to answer. (Answer: 100 cm is 1 metre.)
5. **Say:** Centimetres are used for measuring shorter distances and metres are used for measuring longer distances. Millimetres are used to measure very short distances.
6. **Say:** Write down 3 items in your notebook. Choose one item each that is best measured by millimetres, centimetres and metres.
7. **Ask:** Who would like to share their examples with the class? Raise your hand to answer. (Answers will vary.)

Guided Practice *(10 minutes)*

1. Hand pupils copies of this table or write the table on the board.
2. **Say:** Refer to the chart you wrote in your notebook in the last lesson. It is also written on your board for your reference. Remember 1 metre is 100 centimetres, and 1 centimetre is 10 millimetres. Moving between units is called 'converting' or 'conversion'.
3. Have pupils repeat the words 'conversion' and 'converting' after you.
4. **Say:** Now, copy the problems into your notebooks and convert the measurements into the indicated units given.

   a) 3 cm = _____ mm (Answer: 30mm)

   b) 12 cm = _____ mm (Answer: 120 mm)

c) 285 cm = _____ mm (Answer: 2850 mm)
d) 6 m = _____ cm (Answer: 600cm)
e) 2.4 m = _____ cm (Answer: 240cm)
f) 0.7 m = _____ cm (Answer: 70cm)
g) 40 mm = _____ cm (Answer: 4cm)
h) 250 mm = _____ cm (Answer: 25cm)
i) 400 mm = _____ cm (Answer: 40cm)
j) 500 cm = _____ m (Answer: 5m)

5. Walk around the class. Make sure pupils understand and are doing the task.
6. Invite pupils to come to the board and write their answers.
7. Ask pupils to compare their answers to the answers on the board.

Independent Practice *(10 minutes)*

1. Write the following problems on the board. Ask pupils to complete the problems on their own.
   a) 4m = _____cm = _____mm (Answers: 400cm, 4000mm)
   b) 150cm = _____m = _____mm (Answers: 1.5m, 1500mm)
   c) 700cm = _____m = _____mm (Answers: 70m, 7000mm)
   d) 3m = _____cm = _____mm (Answers: 300cm, 3000mm)
   e) 1000mm = _____cm = _____m (Answers: 100cm, 1m)
   f) 12000mm = _____cm = _____m (Answers: 120cm, 1.2m)
2. Walk around the class. Make sure pupils understand and are doing the task.
3. Invite pupils to come to the board and write their answers.
4. Ask pupils to compare their answers to the answers on the board.

Closing *(5 minutes)*

1. Call pupils to the board to complete the following:
   a) 250cm = _____m (Answer: 2.5m)
   b) 600mm = _____cm (Answer: 60cm)
   c) 50mm = _____cm = _____ m (Answers: 5cm, 0.05m)
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Excellent work! You have practiced converting metric measurements today.

Lesson Title: Converting Between Metres and Kilometres	**Theme:** Measurement and Estimation	
Lesson Number: M-05-028	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to convert between metres and kilometres using the place value chart.	 **Teaching Aids** Worksheet (See below for the worksheet.)	 **Preparation** 1. Draw a metric place value chart on the board. 2. Draw the two tables in the guided practice on the board.

Opening *(5 minutes)*

1. **Say**: Today you will how to convert between metres and kilometres using place value chart.
2. **Say**: Yesterday you learnt that metres were larger than centimetres and millimetres. Today you will learn about kilometres, which are the largest metric unit of measure you will study. Kilometres usually measure long distances travelled in a vehicle like a van. It can also measure distance between cities.
3. Write the following list on the board. Ask pupils what unit of measure you should use to measure it.
   a) The length (diameter) of a coin (Answer: millimetres)
   b) The length of a sheet of paper (Answer: centimetres)
   c) Length of a football field (Answer: metres)
   d) The distance between 2 cities (Answer: kilometres)
   e) A mat (Answer: centimetres)
   f) The length of a pen (Answer: millimetres)
4. Go through the correct answers with the pupils.
5. **Say**: It is important to understand which unit of measure you should use to measure a variety of lengths.

Introduction to the New Material *(10 minutes)*

1. Review what pupils know about the metric table and conversions. **Ask:** How many centimetres make a metre? Raise your hand to answer. (Answer: 100cm)
2. Draw or show the table below to the pupils. Additionally, you can ask the pupils to reference the chart they drew the day before.

10 millimetres (mm)=	1 centimetre
10 centimetres (cm)=	1 decimetre (dm) = 100 millimetres
100 centimetres =	1 metre(m) = 1000 millimetres
1000 metres =	1 kilometre(km)

3. **Ask:** What is the relationship between metres and kilometres? Use the chart to draw a conclusion. Raise your hand to answer. How many metres make 1 kilometre? Raise your hand to answer. (Answer: 1000 metres make one kilometre.)

4. **Say:** A kilometre is the bigger unit here while metre is the smaller unit. So, if you are converting from metre to kilometre, you divide. If you are converting from kilometre to metre, you multiply. Let's look at some examples.
5. Write the following problems on the board. Go through each example with the pupils.
   a) 4,000m = _____km
      (Answer: If 1000 metres= 1 kilometre, then 4,000 metres = 4000 ÷ 1000 = 4 kilometres.)
   b) 6,100m = _____km
      (Answer: If 1000 metres= 1 kilometre, then 6,100 metres = 6100 ÷ 1000 = 6.1 kilometres.)
   c) 6 km = _____m
      (Answer: If 1000 metres= 1 kilometre, then 6 kilometres = 6 x 1000 = 6000 metres.)
   d) 7 km = _____m
      (Answer: If 1000 metres= 1 kilometre, then 7 kilometres = 7 x 1000 = 7000 metres.)
   e) 1/2 km = _____m
      (Answer: If 1000 metres= 1 kilometre, then 1/2 kilometre = 1/2 x 1000 = 500 metres.)

Guided Practice *(7 minutes)*

1. Draw the table below on the board and have pupils copy it to their notebooks.
2. **Say:** Fill in the table. You can use the conversion chart to help you.

Metres	Kilometres	
5000		(Answer: 5 km)
	6.5	(Answer: 6500 m)
5500		(Answer: 5.5 km)
3300		(Answer: 3.3 km)
	7	(Answer: 7000 m)

Metres	Kilometres	
1500		(Answer: 1.5 km)
	2.2	(Answer: 2200 m)
6700		(Answer: 6.7 km)
7500		(Answer: 7.5 km)
	9.5	(Answer: 9500 m)

3. Walk around the class. Make sure pupils understand and are doing the task.
4. Invite individual pupils to give the answers to each blank. Have pupils check their answers.

Independent Practice *(8 minutes)*

1. Give pupils conversion worksheet M-05-028 to solve on their own. They should use the examples above to help them. (Answers: 1j, 2g, 3f, 4i, 5c, 6k, 7d, 8a, 9h, 10e, 11b)
2. Walk around. Make sure pupils understand and are doing the task. Assist pupils who need help.

Closing *(5 minutes)*

1. Invite some pupils to share their answers to each problem. Tell pupils to check their answers.
2. Let the pupils talk about any challenges they may have at this stage. **Ask:** Are there any questions?
3. Answer any questions pupils may have.
4. **Say:** That's right! You learned to convert metres to kilometres and kilometres to metres. Well done!

NAME: _____ DATE: _____

M-05-028: CONVERSION WORKSHEET

Draw a line between the metre and the correct kilometre.

	METRE
1.	7600
2.	480,000
3.	2000
4.	4400
5.	110,000
6.	9000
7.	47,000
8.	34,000
9.	8,800
10.	62,000
11.	4500

	KILOMETRE
a)	34
b)	4.5
c)	110
d)	47
e)	62
f)	2
g)	480
h)	8.8
i)	4.4
j)	7.6
k)	9

Lesson Title: Converting Between Any Metric Measures for Length	**Theme:** Length	
Lesson Number: M-05-029	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to convert between any metric measures for length using the place value chart.	**Teaching Aids** None	**Preparation** 1. Write the basic metric conversion table on the board. 2. Draw the table for the introduction to new material and guided practice on the board before class.

Opening *(3 minutes)*

1. **Say**: Today you will learn how to convert between all metric units of measure.
2. **Ask** pupils how they would convert the following measurements to the required unit of measurement. They should indicate if they should multiply or divide.
   a) 150cm = _____ m (Answer: divide)
   b) 1m = _____cm (Answer: multiply)
   c) 40mm = _____ cm (Answer: divide)
   d) 27km = _____m (Answer: divide)
3. **Say**: It is important to be able to easily remember how to convert between units when you see them, especially when there is a mixed set of problems.

Introduction to the New Material *(10 minutes)*

1. Write the table below on the board and ask pupils to copy it into their notebooks.
2. Ask pupils to work in pairs to complete the table below:

10 millimetres (mm)=	cm	(Answer: 1 centimetre)
10 centimetres (cm)=	mm	(Answers: 100 millimetres)
100 centimetres (cm) =	m	(Answer: 1 metre)
1,000 metres (m) =	km	(Answer: 1 kilometre)

3. **Ask:** Which unit of measurement is the largest? Raise your hand to answer. (Answer: km)
4. **Ask:** Which unit of measurement is the smallest? Raise your hand to answer. (Answer: mm)
5. Ask pupils to work in pairs to write down two things that can be measured using the different units of measurements: kilometre, metre, centimetre and millimetre.

Guided Practice *(8 minutes)*

1. Write the following table but *not* the answers on the board and ask pupils to copy it into their notebooks.
2. Complete the table with the pupils. Guide pupils to use the conversion chart above to answer.

3. **Ask:** If 10 millimetres is 1 centimetre, how many centimetres are 500 millimetres? If 100 centimetres is 1 metre, how many metres is 50 centimetres?

Millimetres	Centimetres	Metres	Kilometres
500			
			2
		1000	
		543	

Answers:

Millimetres	Centimetres	Metres	Kilometres
500	(5000)	(0.5)	(0.0005)
(2000000)	(200,000)	(2,000)	2
(1,000,000)	(100,000)	1000	(1)
(543,000)	(54,300)	543	(0.543)

Independent Practice *(8 minutes)*

1. Write the following problems on the board. Ask pupils to complete the following by providing the value of the unit of measurements.
   a) 0.4 km = _____m = _____cm (Answers: 400 m, 40,000 cm)
   b) 0.15 km = _____m = _____cm (Answers: 150 m, 15,000 cm)
   c) 0.07 km = _____m = _____cm (Answers: 70 m, 7000 cm)
   d) 3 m = _____cm = _____mm (Answers: 300 cm, 3000 mm)
   e) 0.3 m = _____cm = _____mm (Answers: 30 cm, 300 mm)
   f) 90,000 cm = _____m = _____km (Answers: 900 m, 0.9 km)
2. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
3. Invite some pupils to share their answers with the class. Have pupils check their answers while the other pupils are at the board.

Closing *(5 minutes)*

1. Invite pupils to the board to complete the following:
   a) 1500 cm = _____ m = _____ km (Answers: 15 m, 0.015 km)
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Well done! You have practiced converting units today.

Lesson Title: Word Problems Using Metric Measurement for Length	**Theme:** Length	
Lesson Number: M-05-030	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to solve word problems using metric measurement for length.	None	1. Write the metric conversion table on the board. 2. Write or copy the word problems on the board.

Opening *(6 minutes)*

1. **Say**: Today you will learn how to solve word problems using metric measurement for length.
2. Give pupils the opportunity to recap what they have learnt so far about the metric system and basic conversions by writing down words or the conversion table in their notebook.
3. Give pupils a mental drill on unit conversions. For instance, you can reveal the following one after the other and encourage children to give you the equivalent in another unit.

a. 2500 m = _____km	b. 1800 m = _____km
c. 5400 m = _____km	d. 2.3 km = _____m
e. 1900 m = _____km	f. 9.4 km = _____m
g. 7500 m = _____km	h. 1.7 km = _____m
i. 5800 m = _____km	j. 5.5 km = _____m

(Answers: a) 2.5km b) 1.8km c) 5.4km d) 2300m e) 1.9km f) 9400m g) 7.5km h) 1700m i) 5.8km j) 5500m)

Introduction to the New Material *(10 minutes)*

1. Write the following problem below on the board:
   a) John rode 2 kilometres on his bike. His sister Sally rode 3000 metres on her bike. Who rode the farthest? How much farther did they ride? Answer in kilometres.
2. **Say:** How do we solve this problem? There are four steps. Let's do them together. Write the steps in your notebooks.
   Step 1: Underline important information and numbers. (Answer: John rode 2 kilometres on his bike. His sister Sally rode 3000 metres on her bike.)
   Step 2: Understand what the problem is asking for.
   Ask: What is this problem asking us to do? Raise your hand to answer. (Answer: Determine who rode the farthest and by how much.)
   Say: When going from a large unit to a small unit, you multiply. When going from a small unit to a large unit, you divide.
   Step 4: Convert so all the units in the problem are the same.
   Say: Since the question is asking for the answer in kilometres, convert Sally's distance to km by dividing: 1000 m = 1 km so 3000 m ÷ 1000 m = 3 km.
   Step 5: Solve

Say: Sally rode farther because she rode 3 km and John only rode 2 km. Subtract to find the difference: 3km - 2km = 1 km.

Guided Practice *(7 minutes)*

1. **Say:** Let's do another problem.
2. Write the problem below on the board. Have pupils copy it into their notebooks.
   a) Jessica is measuring two line segments. The first line segment is 30 cm long. The second line segment is 500 mm long. How long are the two line segments together? Answer in centimetres.
3. **Say:** Let's go through the four steps together again.
   Step 1: Underline key words and numbers. (Answer: Jessica is measuring two line segments. The first line segment is 30 cm long. The second line segment is 500 mm long.)
   Step 2: Understand what the problem is asking for. **Ask**: What is this problem asking us to do? (Answer: Find the length of both line segments together.)
   Say: When going from a large unit to a small unit, you multiply. When going from a small unit to a large unit, you divide.
   Step 3: Since the line segments are in different units, convert mm into cm. 10 mm = 1 cm so divide 500mm ÷ 10 mm = 50 cm
   Step 4: Add to solve since 'together' is an addition word. (Answer: 50 cm + 30 cm = 80 cm)

Independent Practice *(10 minutes)*

1. Hand out the following problems or write them on the board. The answers are at the bottom of this section.
2. Pupils must work alone. **Say**: Write a mathematical expression and solve the word problems using the four steps.
   a) At the weekend, I walked 2km. My father walked 500m further than me. How far did he walk?
   b) Two shelves are 75cm and 87cm long. What is their total length?
   c) A family sets off to drive 524km. After 267km, how much further do they have to go?
   d) A car is 4 metres long and a boat is 8 metres long. How long are the car and boat altogether?
   e) A tree is 7 metres high. A giraffe is 2 metres shorter than the tree. How tall is the giraffe?
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
4. Have five pupils share their mathematical expressions and their answers.
5. Ask the class to compare their answers to the answers given.

(Answers: a) 2500 m b) 162 cm c) 257 km d) 12 m e) 5 m)

Closing *(2 minutes)*

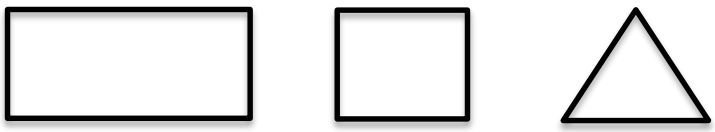
1. **Say**: Let's quickly recall the 4 steps to solving a conversion word problem. Ask pupils to raise their hand to participate in discussion.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Well done, pupils. You have done very well with word problems today.

Lesson Title: Calculating Area of Rectangles and Squares Using Counting of Area and Formulae	**Theme:** Measurement and Estimation	
Lesson Number: M-05-031	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to calculate area of rectangles and squares using counting of area covered and formulae.	Rulers (See below for a ruler that is to scale in the case that there are no rulers available.) Worksheet (See below for worksheet.)	Draw the shapes from the opening on the board.

Opening *(5 minutes)*

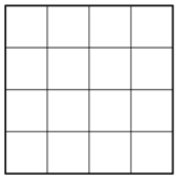
1. **Say**: Today you will learn how to calculate area of rectangles and squares using two methods, counting the area covered and by the formulae.
2. Ask pupils to work in pairs and write down the names of the following shapes:



3. Ask pupils to measure and record the length and breadth of their desks.
4. Invite two pupils to write their answers on the board.
5. **Say**: Today we will explore these shapes and how to measure their area.

Introduction to the New Material *(5 minutes)*

1. Ask pupils to work in pairs to write the definition of the area of an object.
2. **Say:** Area measures the space occupied by an object.
3. **Say:** Estimate what fraction of your desk space is taken up by your book.
4. **Say:** To find the area of the desk you use the formulae: Area = length x width.
5. Write**:** If the length of the desk is 60 cm and the width is 35 cm, then you calculate the area as follows.
   Area = 60 cm x 35 cm = 2100 cm^2
6. **Say**: We use the unit of measure centimetres squared to describe area.
7. **Say**: You can also use the counting of squares to determine the area of a rectangle or square.
8. Draw the following object on the board.



9. **Say**: Draw the object and count the number of unit squares that make up the whole square. How many squares did you count? Raise your hand to answer. (Answer: 16 square units)

Guided Practice *(10 minutes)*

1. Draw the shapes from 'Exercise 1' of the worksheet on the board, or hand out worksheets.
2. **Say:** Calculate the area of these shapes by counting the squares. Write your answers in your notebook or on your worksheet.
3. Give pupils time to calculate the area of each shape by counting the squares. Walk around the class. Make sure pupils understand and are doing the task.
   (Answers, Exercise 1: a) 15 square units b) 30 square units c) 20 square units d) 10 square units)
4. **Say:** Counting is one way to get the area of a rectangle. But there will not always be squares to count. Another way to get the area is to multiply the 'length' and 'width of the rectangle. The 'length' is the long side. The 'width' is the short side.
5. Direct the pupils to exercise 2 of the worksheet, or draw the shapes from exercise 2 on the board. **Say:** Find the area of the rectangles by using the formulae.
   (Answers, Exercise 2: a) 6cm x 10cm = $60cm^2$ b) 6m x 2m = $12m^2$ c) 20mm x 5mm = $100mm^2$)

Independent Practice *(10 minutes)*

1. Draw the rectangles from exercise 3 and 4 of the worksheet on the board.
2. **Say:** Calculate the area of each shape of exercise 3 by counting the squares. Calculate the area of each shape in exercise 4 by multiplying the length and the width of each rectangle.
   (Answers, Exercise 3: a) 25 square units; b) 24 square units; c) 15 square units)
   (Answers, Exercise 4: a) $24cm^2$ b) $250mm^2$ c) $6cm^2$)
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.

Closing *(5 minutes)*

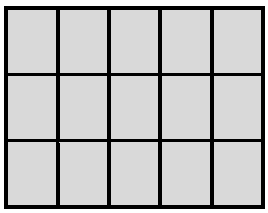
1. Ask pupils to:
   a) Look at the measurements they took of their desk and find the area of the desk.
   b) Look at the measurements they took of their book and find the area of the book.
2. Invite pupils to share their answers with the class.
3. **Ask:** Are there any questions?
4. Answer any questions pupils have.
5. **Ask:** What are the two ways of finding the area of a rectangle? Raise your hand to answer.
   (Answers: By counting and by multiplying the length and the breadth of the rectangle.)
6. **Say:** Well done, class! You have practiced two ways of finding the area of rectangles and squares.

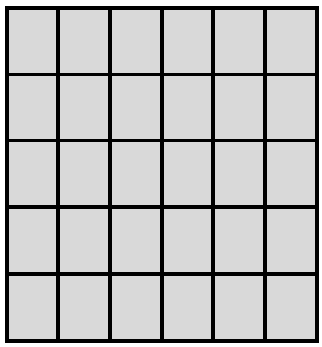
MM
CM
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
6 5 4 3 2 1
INCH

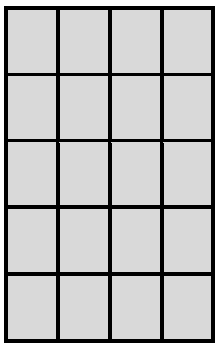
NAME_____ DATE_____

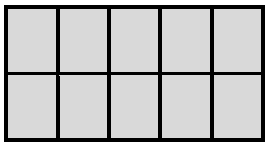
M-05-031 WORKSHEET: FINDING THE AREA OF A RECTANGLE

Exercise 1

a) 

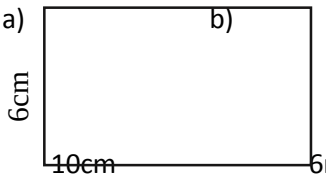
b) 

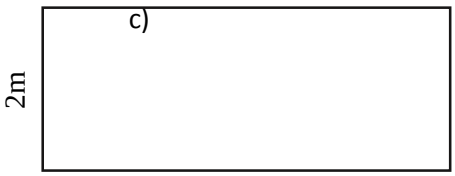
c) 

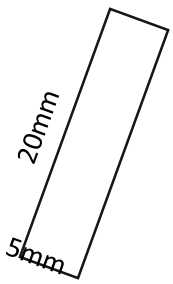
d) 

Answers: a) _____ b) _____ c) _____ d) _____

Exercise 2

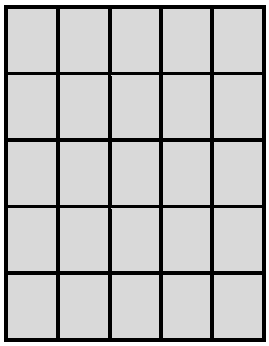
a) b) 

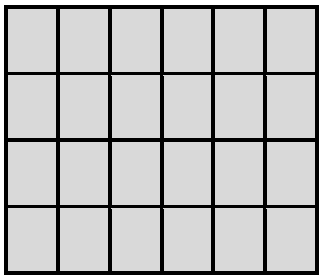
c) 

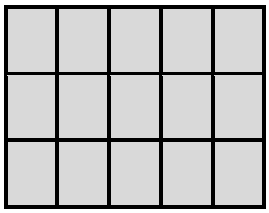


Answers: a) _____ b) _____ c) _____

Exercise 3

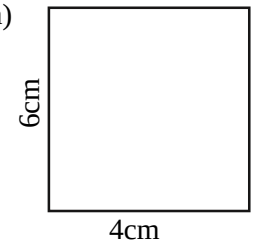
a) 

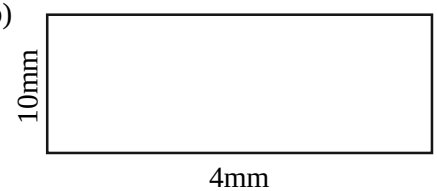
b) 

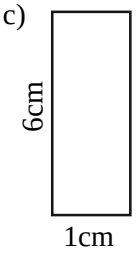
c) 

Answers: a) _____ b) _____ c) _____

Exercise 4

a) 

b) 

c) 

Answers: a) _____ b) _____ c) _____

Lesson Title: Area, Mass, Volume and Capacity (Includes Revision)	**Theme:** Measurement and Estimation	
Lesson Number: M-05-032	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes:** By the end of the lesson, pupils will be able to calculate the total mass of heavy and light objects.	 **Teaching Aids** None	 **Preparation** Write the problems for the guided practice and independent practice on the board.

Opening *(5 minutes)*

1. **Say:** Today you will learn how to calculate the total mass of objects.
2. Divide the class into two groups. Pupils in each group should work in pairs.
3. **Say:** Group 1 pairs, write down as many light objects you know.
4. **Say:** Group 2 pairs, write down as many heavy objects as possible.
5. Let the children compete among themselves.
6. **Ask**: How many objects did each group come up with? Raise your hand to answer.
7. (Answer**:** Choose one pupil from each group to answer.)
8. Which group had the most number of objects? (Answer: Either group 1 or 2 raise their hands.)

Introduction to the New Material *(10 minutes)*

1. **Say:** We are going to look at the calculation of total mass for both light and heavy objects.
2. **Ask:** What do you think mass is? Raise your hand to answer.
3. Allow pupils to give about 5 answers.
4. **Ask:** What is the definition of mass? Raise your hand to answer.
5. **Say:** Mass is a measure of how much matter is in an object. For example, a gold bar could be quite small but could have a mass of 1 kilogram. So it contains a lot of matter. Mass is commonly measured by how much something weighs. But weight can change for different locations. For example, if we were on the moon, we would all weigh less than we do here on Earth. However, even on the moon our mass stays the same.
6. Write the following problems on the board. Ask pupils to write the answers in their notebooks.
   Put these masses in order from smallest to biggest:
   a) 34 grams 78 grams 12 grams 77 grams 14 grams
      (Answers: 12g, 14g, 34g, 77g, 78g)
   b) 121 grams 87 grams 132 grams 177grams 212 grams
      (Answers: 87g, 121g, 132g, 177g, 212g)
   c) 44 grams 776 grams 19 grams 305grams 200 grams
      (Answers: 19g, 44g, 200g, 305g, 776g)
7. Call on four pupils to read their answers. Write the answers on the board and have other pupils check their answers.
8. **Say:** Let's try another type of problem.
9. Write the following problems on the board. Ask pupils to write the problems and the answers in their notebooks.
   a) 73g + 6g + 8g = (Answer: 87g)
   b) 3g + 6g + 8g = (Answer: 17g)

c) 12g + 34g + 5g = (Answer: 51g)
d) 12g + 12g + 4g = (Answer: 28g)

Guided Practice *(7 minutes)*

1. Write the following problems on the board. Work through these problems with the pupils.

   A cube weighs 4 grams each. How much would:

   a) 12 cubes weigh? (Answer: 12 x 4 = 48 grams)
   b) 23 cubes weigh? (Answer: 23 x 4 = 92 grams)
   c) 7 cubes weigh? (Answer: 7 x 4 = 28 grams)
   d) 10 cubes weigh? (Answer: 10 x 4 = 40 grams)

Independent Practice *(8 minutes)*

1. Write the following problems on the board. Or, make copies of the following questions for the pupils.
   a) If a pencil weighs 26g, how heavy would 2 pencils be?
   b) An egg weighs about 50 grams. How much 3 eggs weigh?
   c) A paper clip weighs 3 grams; a ruler weighs 52 grams. What is their total weight?
   d) Mark is carrying a box that contains 20 grams of sugar, 5 grams of tea and 2 grams of powdered milk. The empty box weighs 40 grams. What is the total weight of the box with all its ingredients?
   e) Simone has 120 grams of sand in her bucket. She spills 30 grams of sand when she drops the bucket. How much sand does she have now?
2. Ask pupils to complete the problems on their own in their notebooks. Tell pupils to write both a mathematical expression for the word problem and the answer.
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help. (Answer: a) 52g b) 150g c) 55g d) 67g e) 90g)

Closing *(5 minutes)*

1. Invite 5 pupils to come to the board and write their mathematical expressions and answers. Have pupils compare their answers to the answers on the board.
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Good work today. You now understand how to do problems with mass in grams.

Lesson Title: Understanding the Difference between Volume and Capacity by Comparing and Contrasting	**Theme:** Measurement and Estimation	
Lesson Number: M-05-033	**Class/Level:** Class 5	**Time:** 35 minutes

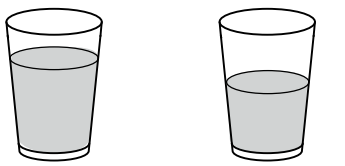
Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to identify what capacity and volume are by comparing and contrasting.	1. Prestik or tape. 2. Cut out shapes from an enlarged copy of the lesson plan, or pre-drawn shapes. (You can photocopy a set of the objects in the worksheet below for small groups to share.)	Enlarge and copy the lesson plan and cut out the shapes or create a class set of the shapes. Or, draw the shapes on the board.

Opening *(5 minutes)*

1. **Ask** pupils to work in pairs to compare the number of books they have.
2. **Ask** pupils to estimate the weight of their bags and compare them.
3. **Ask** pupils to say which of the bags takes up more space. Raise your hand to answer.
4. **Say**: Today you will learn how to identify capacity and volume by comparing and contrasting.

Introduction to the New Material *(8 minutes)*

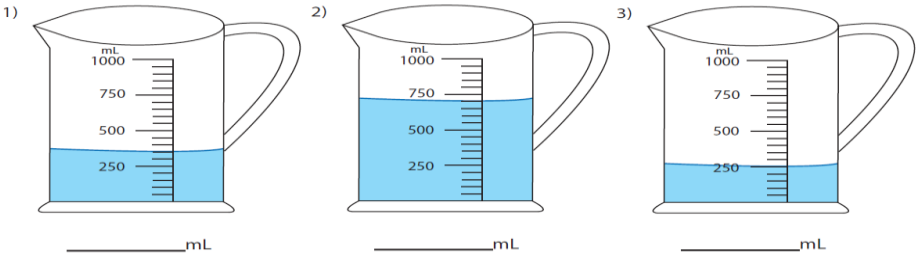
1. **Say:** The 'volume' of a solid object is the amount of space it takes up. The 'capacity' is the amount that a container will hold.
2. Draw the following glasses on the board. Ask pupils to work in pairs.
3. **Ask:** Which container has a higher capacity, the one with milk or the one with orange juice? Raise your hand to answer. (Answer: Both glasses have the same 'capacity', but the 'volume' of the milk is more than that of the orange juice.)



milk orange juice

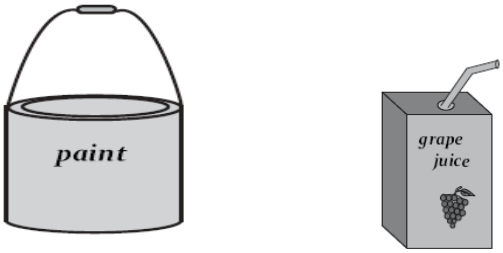
Guided Practice *(9 minutes)*

1. Put the following on the board. Have pupils compare the volume and capacity of the shapes.



(Answers: All three items have the same 'capacity' of 1000ml. However, the 'volume' of item 1 is less than that of item 2, and the volume of item 3 is less than that of item 1.)

2. Put the following shapes on the board. Have pupils compare the capacity and volume of the shapes:



(Answer: The paint container has a higher capacity and volume than the grape juice.)

Independent Practice *(8 minutes)*

1. Draw the following shapes on the board. Compare the capacities and volumes of the following pairs of shapes.

a) 300ml 200ml

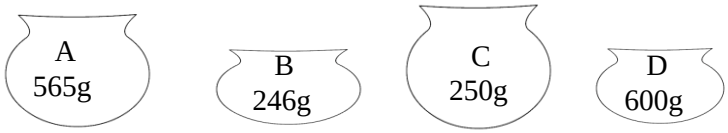
b) 500ml 435ml

c) 130ml 825ml

(Answers: a) The first container has a higher capacity and volume than the second container. b) The two containers have the same capacity, but the volume of the first container is higher than that of the second container. c) The first container has a greater capacity than the second container, but the volume of the first container is less than that of the second container.)

Closing *(5 minutes)*

1. Draw the following on the board. Call pupils to the board to compare the volumes and capacities of the following shapes:

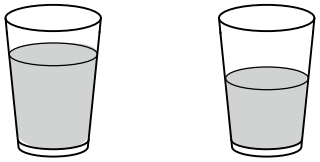


   a) Compare the capacity and volume of containers A and B.
      (Answer: Container A has higher capacity and volume than container B.)
   b) Compare the capacity and volume of containers C and D.
      (Answer: Container C has higher capacity but lower volume than container D.)
2. **Ask:** Are there any questions?
3. Answer any questions pupils have.
4. **Say:** Well done, pupils! You learnt to compare the capacity and volume of objects.

NAME_____ DATE_____

M-05-33 WORKSHEET

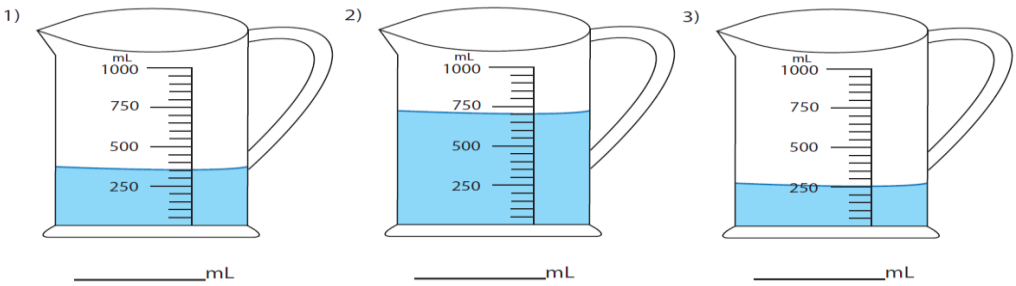
Introduction to the New Material



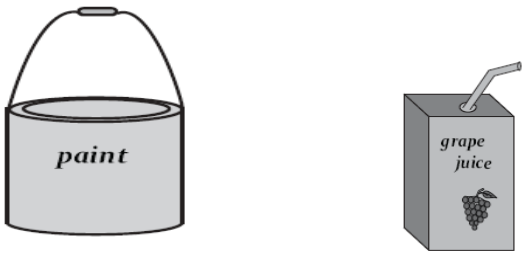
milk orange juice

Guided Practice

1) 2) 3)



_____mL _____mL _____mL



Independent Practice

a) 300ml 200ml

b) 500ml 435ml

c) 130ml 825ml

Closing

A 565g B 246g C 250g D 600g

Lesson Title: Calculating Volume and Capacity	**Theme:** Measurement and Estimation	
Lesson Number: M-05-034	**Class/Level:** Class 5	**Time:** 35 minutes

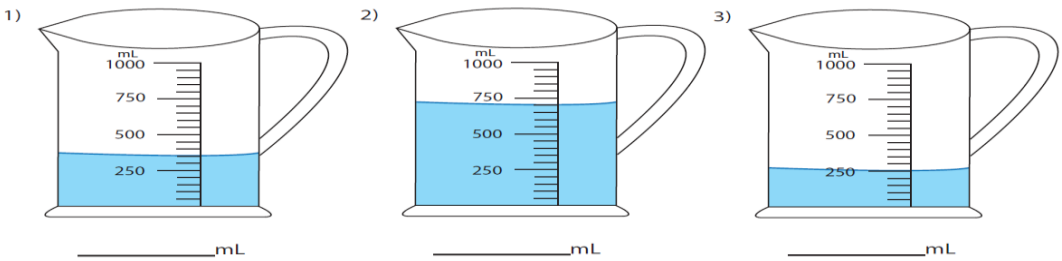
Learning outcomes By the end of the lesson, pupils will be able to calculate volume and capacity.	**Teaching Aids** 1. Prestik or tape. 2. Enlarged and cut out or drawn shapes.	**Preparation** Enlarge and copy the lesson plan and cut out the shapes, or draw the shapes.

Opening *(3 minutes)*

1. **Say:** Guess how many books your bag can hold.
2. **Say:** Work in groups of three to compare whose bag can hold more books.
3. **Ask:** What is the difference between capacity and volume? Raise your hand to answer. (Answer: 'Capacity' is the amount that a container will hold, and 'volume' is the amount that a container will hold *in cubic units*).
4. **Say**: Today you will learn how to calculate volume and capacity.

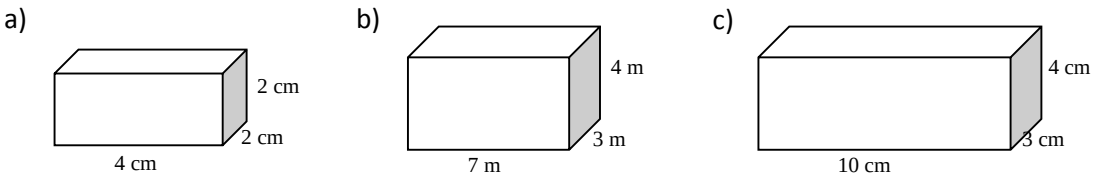
Introduction to the New Material *(8 minutes)*

1. Put the following shapes on the board or print copies for the pupils.
2. **Ask** pupils to work in pairs and write down the volume of each shape using the measurement on the beaker.



(Answer: 1) 350ml 2) 700ml 3) 250ml)

3. Put the following shapes on the board or print copies for the pupils.
4. **Ask** pupils to work in pairs to identify and record the length, width, and height of each shape.



Answers**:**

	Length	Breadth	Height
a)	4cm	2cm	2cm
b)	7m	3m	4m
c)	10cm	3cm	4cm

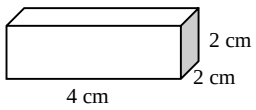
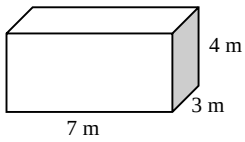
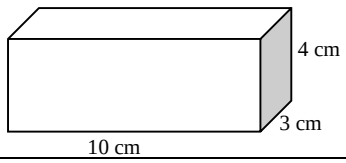
5. **Say**: To find the volume of each shape we can use the formulae. The formulae for volume is as follows:

Volume = length x width x height. Let's calculate the volume of shape a.

6. Write Volume = 4 cm x 2 cm x 2 cm. Raise your hand to answer. (Answer: 16 cm^3)
7. **Say**: The unit of measure for volume is unit cubed because the shape is three dimensional and uses three sides to calculate the volume.

Guided Practice *(8 minutes)*

1. Put the following shapes on the board or photocopy it for the pupils prior to class. Assist pupils to find the volumes of the following shapes:

Shape	Length	Width	Height	Volume (l x w x h)
	4cm	2cm	2cm	4cm x 2cm x 2cm = 16cm^3
	7m	3m	4m	7m x 3m x 4m = 84 m^3
	10cm	3cm	4cm	10cm x 3cm x 4cm = 120cm^3

2. Walk around the classroom. Make sure pupils understand and are doing the task. Discuss with pupils and assist them when they need help.

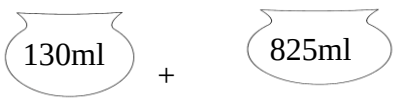
Independent Practice *(8 minutes)*

1. Put the following questions on the board. Ask pupils to write their answers in their notebooks.

   Find the total capacity of the shapes below:

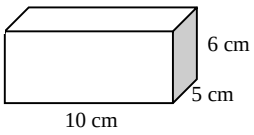
   a)  (Answer: 500ml)

   b)  (Answer: 935ml)

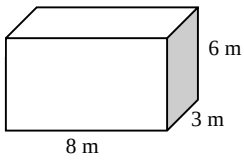
   c)  (Answer: 955ml)

Calculate the volumes of the following shapes:

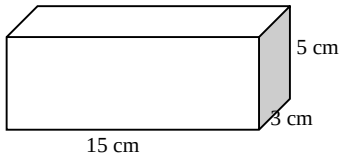
a)



b)



c)



(Answer: a) 10 x 5 x 6 = 300cm^3 b) 8 x 3 x 6 = 144m^3 c) 15 x 3 x 5 = 225cm^3)

Closing *(8 minutes)*

1. Invite pupils to the board to solve the following questions:

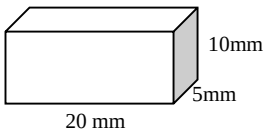
   The figures below labeled A-E show the capacities of different objects.

   Find the value of:

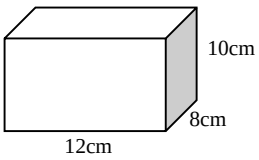
   a) A + B (Answer: A + B = 565g + 246g = 811g)
   b) D – B (Answer: D – B = 600g – 246g = 354g)

   Calculate the volumes of the figures below:

a)



b)



   (Answers: a) 20mm x 5mm x 10mm =1000mm^3 b) 12cm x 8cm x 10cm = 960cm^3)

2. **Say:** Good work today! You have learnt to calculate the volume of cubes.

Lesson Title: Word Problems Involving Area, Mass, Volume and Capacity	**Theme:** Measurement and Estimation	
Lesson Number: M-05-035	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning outcomes** By the end of the lesson, pupils will be able to solve word problems involving area, mass, volume and capacity.	 **Teaching Aids** Worksheet with word problems (optional)	 **Preparation** Copy the sections with word problems for the pupils.

Opening *(5 minutes)*

1. **Say:** Work in pairs and write down the names of two things you can measure.
2. **Say:** Estimate the lengths, weights and heights of the things you have written down. Write a sentence involving your item and the estimated length, weight or height. Raise your hand to share your sentence.
3. Write one sample problem on the board to create a word problem.
4. Write this example on the board: Your notebook is 30 cm in length and 20 cm in width. Find the area of the notebook. Raise your hand to answer. (Answer: 20 cm x 15 cm = 300 cm^2)
5. **Say**: Today you will learn how to solve word problems involving mass, volume and capacity.

Introduction to the New Material *(8 minutes)*

1. **Say:** We are going to write a short sentence that can combine the lengths or weights or heights of the objects you have identified. (Example: Musa's chair is 30cm long and 25cm wide.)
2. Write on the board as you **say:** The length of a table is 10cm, and the width is 8cm. Draw the table in your notebooks as I have on the board. Find the area of the table. Raise your hand to answer. (Answer: 10cm x 8cm = 80cm^2)
3. Write on the board as you **say**: The length of the tissue box is 7 cm, the width is 4 cm and the height is 5 cm. Find the volume of the box. Raise your hand to answer. (Answer: 7 cm x 4 cm x 5 cm = 140 cm^3)
4. Do a third example with one of the things a pupil has written down.

Guided Practice *(9 minutes)*

1. **Ask** pupils to work with their partners to complete the following problems. Write the problems on the board or give pupils a handout with the problems written on it.
   a) A classroom is 9.5m long and 10m wide. What is the area of the room?
   b) Frank has a chop box. The length is 17cm, and the width is 6cm. If the height is 9cm, what is the volume of the chop box?
   c) A man weighs 94kg. His wife weighs 85kg, and their little son weighs 29kg. What is the total mass of the family? (94kg + 85kg + 29kg = 208kg)
2. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
3. Invite some pupils to write their mathematical expressions and answers on the board.
4. Have pupils compare their answers to the answers on the board.

(Answers: a) 9.5m x 10m = 950m^2; b) 17cm x 6cm x 9cm = 918 cm^3; c) 94kg + 85kg + 29kg = 208kg)

Independent Practice *(8 minutes)*

1. Write the problems on the board or give pupils a handout with the problems written on it.
2. **Ask** pupils to work independently to do complete the following problems. **Say:** Complete the two problems on your own. Remember to write a mathematical expression and solve it to find the answer.
    a) Four diesel tankers with a capacity of 5463 gallons each put their contents into a big underground tank at a petrol station. What is the total capacity of the four diesel tankers?
    b) A box of matches is 3 inches by 2 inches. If the height is 1 inch, what is the volume of the box?
    c) Tom wants to fill his bucket. His bucket holds 1 litre of water. That is 1000ml. He has five different containers with the capacities 500ml, 200ml, 300ml, 50ml, and 250ml. What different ways can he fill his bucket?
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
4. Go over the answers with the pupils while they check their work in their notebooks.
5. Invite pupils to share one way they combined the different buckets to get 1000ml.

(Answers: a) 5463 + 5463 + 5463 + 5463 = 21,852 gallons b) 3 x 2 x 1 = 6in^3
c) 500 + 200 + 50 + 250 = 1000ml, 300 + 300 + 200 + 200 = 1000ml, 500 + 200 + 300 = 1000ml)

Closing *(5 minutes)*

1. Write the following problem on the board:
    a) The weight of a bus and 45 school children on it is 9978kg. If the total weight of the school children is 8965kg, what is the weight of the bus? (Answer: 9978 – 8965 = 6987kg)
2. **Ask**: What steps do you need to take to solve the problem? Raise your hand to answer.
3. **Say:** Nicely done, class! You have practiced solving word problems involving mass, volume and area today.

Lesson Title: Identify Acute and Obtuse Angles Using Degrees	**Theme:** Geometry Angles	
Lesson Number: M-05-036	**Class/Level:** Class 5	**Time:** 36 minutes

Learning outcomes By the end of the lesson, pupils will be able to identify acute and obtuse angles using degrees.	**Teaching Aids** Protractor (See below for a protractor that can be cut out and used if protractors are not available.)	**Preparation** Copy the protractor or secure protractors to use in class. Draw the angles for the guided practice and independent practice on the board.

Opening *(5 minutes)*

1. **Ask:** What do you get when two lines meet or cross? Raise your hand to answer.

(Answer: An angle.)

2. **Ask:** What is the name of the instrument used for measuring angles. Raise your hand to answer.

(Answer: A protractor.)

3. Ask pupils to join two lines to form any angle in their notebooks.
4. **Say**: Today we are going to learn how to identify acute and obtuse angles using degrees.

Introduction to the New Material *(8 minutes)*

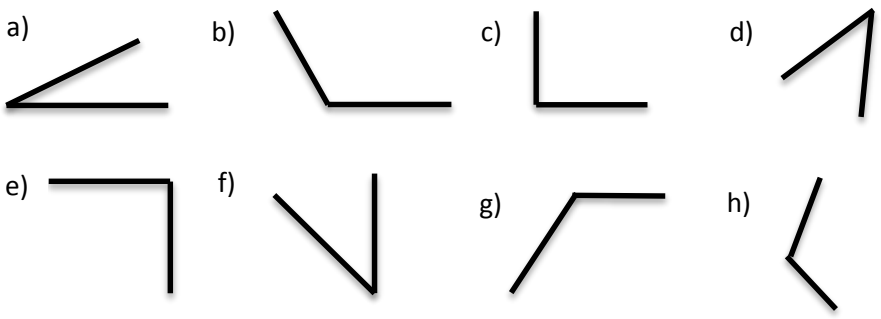
1. Draw the following angles on the board. Ask pupils to estimate the values of the angles:

(Answers: a) about 60^0 b) about 90^0 c) about 120^0)

2. **Ask:** Which of the angles is the smallest? Raise your hand to answer.
   (Answer: The first angle is the smallest.)
3. Write the following on the board: 'Acute angle, Obtuse angle, Right angle'.
4. **Say:** If the angle is less than 90 degrees it is called an 'acute angle'. When it is more than 90 degrees it is called an 'obtuse angle'. Write in your notebook that an 'acute angle' is smaller than 90 degrees, and an 'obtuse angle' is bigger than 90 degrees. A 'right angle' is exactly 90 degrees.
5. Draw a square in the corner of the right angle to indicate that it is 90 degrees.

Guided Practice *(9 minutes)*

1. Put the pupils in pairs.
2. Draw the angles on the next page on the board and have pupils copy them into their notebooks.
3. **Say:** Use your definitions to identify what type of angles they are.

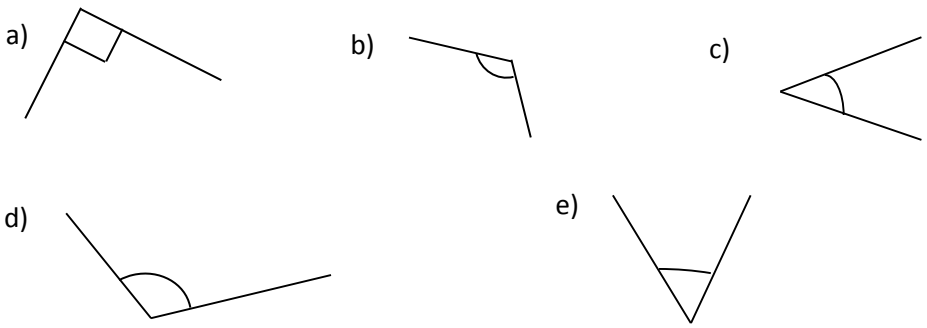


(Answers: a) acute; b) obtuse; c) right d) acute e) right f) acute g) obtuse h) obtuse)

4. **Say:** Remember, angles smaller than a right angle are called 'acute angles'. Angles bigger than a right angle are called 'obtuse angles'. Write the correct name next to each angle.
   (Answers: a) acute b) obtuse c) right d) acute e) right f) acute g) obtuse h) obtuse)
5. Invite pupils to come to the board and write their answers.
6. Have pupils compare their answers to the answers on the board while the other pupils write on the board.

Independent Practice *(8 minutes)*

1. Draw the angles below on the board.
2. **Say***:* Label the angles below as bigger than right angles, smaller than right angles, or right angles.

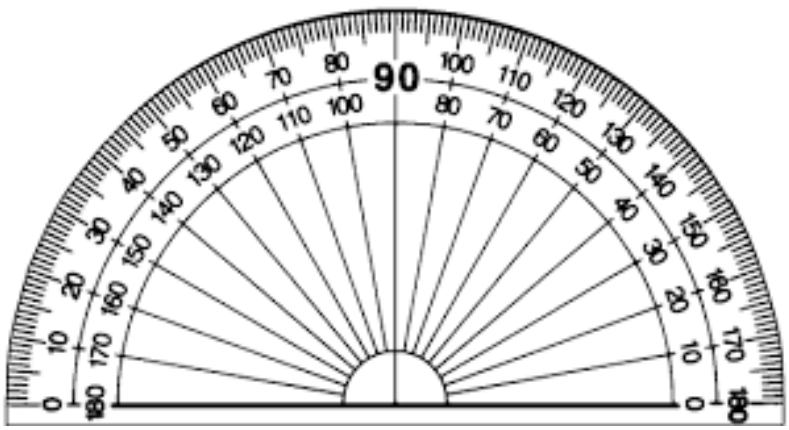


(Answers: a) right angle b) bigger than c) smaller than d) bigger than e) smaller than)

3. **Say:** Use your right angle to label the above angles as acute, obtuse or right angles.
   (Answers: a) right b) obtuse c) acute d) obtuse e) acute)
4. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
5. Have pupils to exchange their notebooks to check their work as you read the answers aloud.

Closing *(5 minutes)*

1. Invite pupils to the board to draw an angle and say whether it is an acute, obtuse or right angle.
2. Ask pupils to explain their answers.
3. **Say:** Well done, pupils! You have learnt a lot about angles.



Lesson Title: Measuring Acute and Obtuse Angles	**Theme:** Geometry Angles	
Lesson Number: M-05-037	**Class/Level:** Class 5	**Time:** 35 minutes

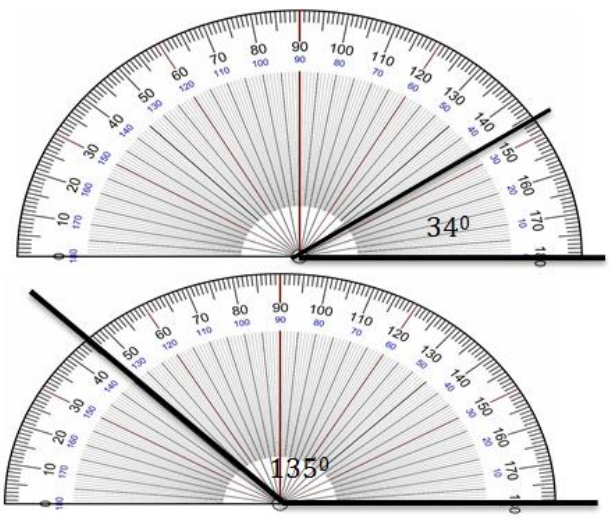
Learning outcomes By the end of the lesson, pupils will be able to measure acute and obtuse angles using a protractor.	**Teaching Aids** 1. Protractors (See below for a printable protractor.) 2. Worksheet (See below for worksheet to print.)	**Preparation** 1. Draw the angles for the guided practice on the board before class begins. 2. Print worksheet with angles for pupils to measure.

Opening *(5 minutes)*

1. **Say:** Work in pairs to draw two acute and two obtuse angles.
2. **Ask:** What makes an angle obtuse? Raise your hand to answer.
   (Answer: It is bigger than a right angle.)
3. **Ask:** What makes an angle acute? Raise your hand to answer.
   (Answer: It is smaller than a right angle.)
4. **Say**: Today you will learn to measure acute and obtuse angles using a protractor.

Introduction to the New Material *(8 minutes)*

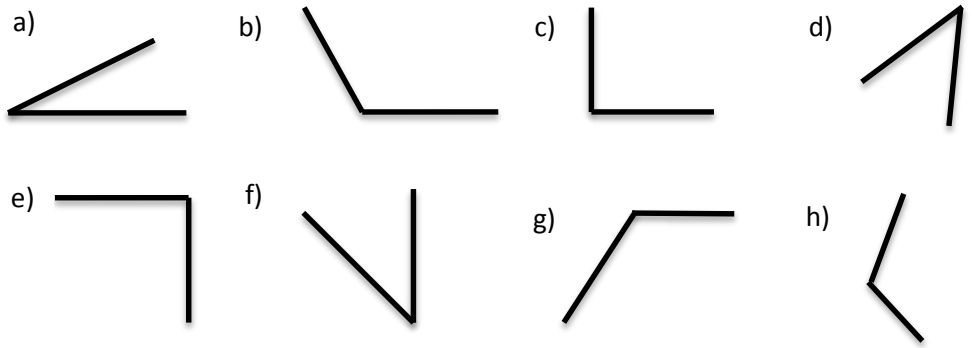
1. **Say:** We are going to draw a 34-degree angle with a protractor.
2. Show pupils a protractor. **Say:** This is a protractor. It is used to measure and draw angles.
3. Have pupils say the word 'protractor' three times out loud.
4. **Say:** Let us draw a 34-degree angle.
5. **Ask** pupils to use the protractor to draw the following angles: 34˚ and 135˚.
6. Show pupils step by step how to draw an angle with the protractor.
7. **Say:** First, draw a straight line. Place a dot at the left end of the line. This dot represents the vertex of the angle. Place the centre of the protractor on *the dot* and the baseline of the protractor along the line.



8. **Say:** The numbers along the edge of the protractor are the angle measures. We can measure from the right or the left. In this case, we are measuring from the right.
9. **Say:** So let's find 34 degrees.
10. **Say:** Find 34 degrees on the scale and mark a small dot at the edge of the protractor.
11. **Say:** Join the vertex to the small dot with a ruler to form the second arm of the angle.
12. Repeat the instructions to draw an angle with 135 degrees.

Guided Practice *(9 minutes)*

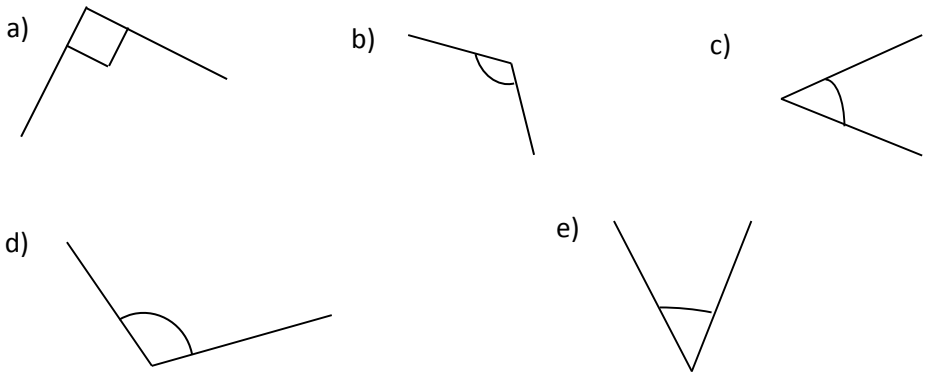
1. Draw the following angles on the board. Have pupils copy the angles into their notebooks.
2. **Say:** Use your protractor to measure the angles below. Write down whether the measured angle is acute, obtuse or a right angle.



3. Go over each answer with the pupils. Show them how to measure each angle with the protractor.
   (Answers: a) acute b) obtuse c) right d) acute e) right f) acute g) obtuse h) obtuse)

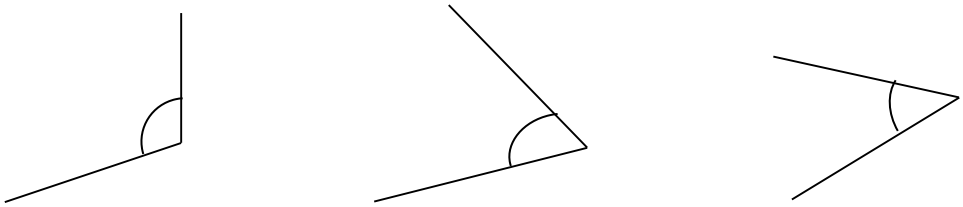
Independent Practice *(8 minutes)*

1. Hand out copies of the following angles to the pupils. Ask pupils to use their protractors to measure the value of the following angles:



Closing *(5 minutes)*

1. Draw the following angles on the board. Invite pupils to the board to come and measure the angles using a protractor.



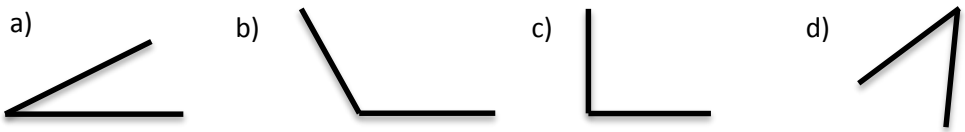
2. **Say:** Today you learnt how to measure and draw angles with a protractor. Well done!

NAME_____ DATE_____

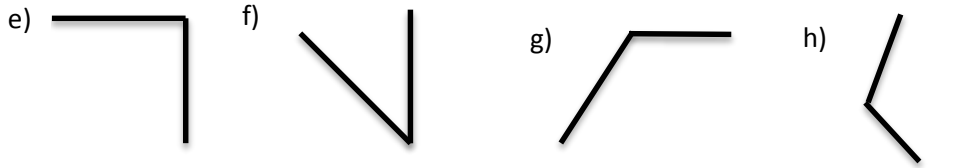
M-05-028: ANGLE MEASUREMENT WORKSHEET

GUIDED PRACTICE

a) b) c) d)



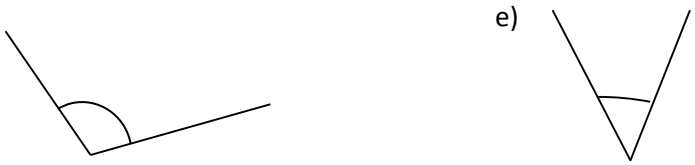
e) f) g) h)



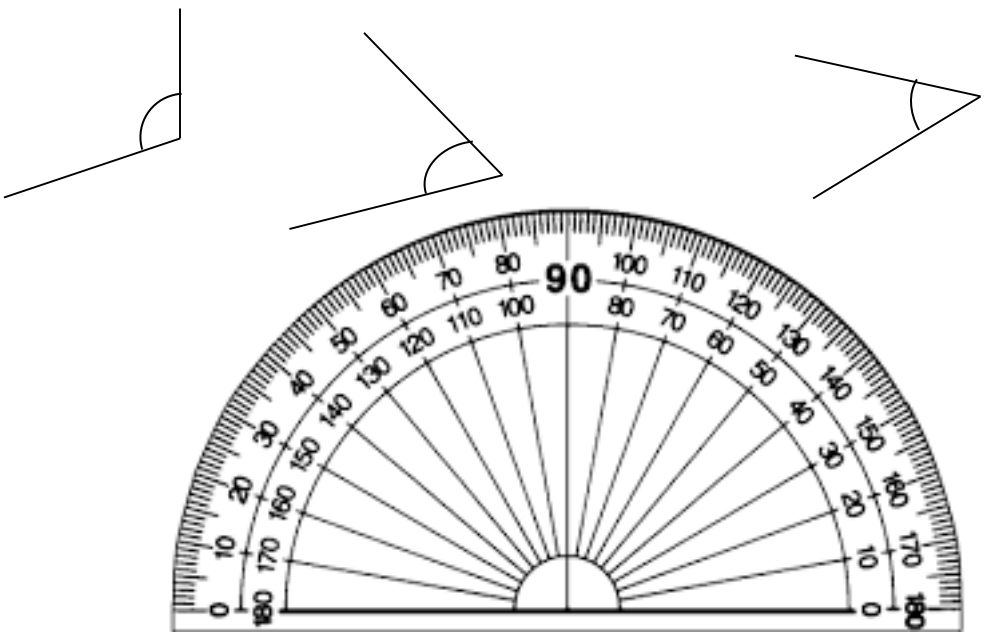
INDEPENDENT PRACTICE

a) b) c)

d) e)



CLOSING



Lesson Title: Comparing Angles Using Degrees	**Theme:** Geometry Angles	
Lesson Number: M-05-038	**Class/Level:** Class 5	**Time:** 35 minutes

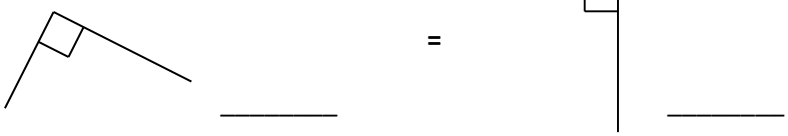
Learning outcomes By the end of the lesson, pupils will be able to compare angles using degrees.	**Teaching Aids** Protractor (See below for printable protractor.)	**Preparation** Draw the angles on the board for the guided practice and independent practice before class.

Opening *(5 minutes)*

1. **Say:** Work with a partner to draw and measure two acute and two obtuse angles. Record your answers in your notebooks.
2. **Ask:** What is the difference between acute and obtuse angles? Raise your hand to answer. (Answer: Acute angles are less than 90 degrees and obtuse angles are more than 90 degrees.)
3. **Say**: Today you will learn how to compare angles using degrees.

Introduction to the New Material *(8 minutes)*

1. Write the following on the board: 34˚, 75˚, 135˚, 105˚, 35˚ , 72˚
2. **Say:** Look at the angles on the board. Work with a partner in a pair. Write the angles in your notebook in order from smallest to largest. (Answer: 34˚, 35˚, 72˚, 75 ˚, 105˚, 135˚)
3. Invite pupils to give the numbers in order. Have pupils check their answers.
4. Let's look at the following angles and practice measuring them using a protractor.
5. **Ask:** What can you say about the angles below after you measured them? Raise your hand to answer. (Answer: They are both right angles because they both measure 90 degrees.



6. **Say**: These two angles are equal. We can insert an equal sign between them to make a comparison.

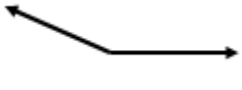
Guided Practice *(9 minutes)*

1. Write the following angles and instruction on the board: Compare each angle to the measurement given, using **<, >,** or **=** symbols.
2. **Say:** Explain your answers by writing whether the angels are acute, obtuse or right angles.

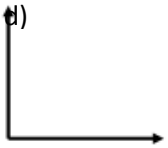
a) 360° ☐

b) 60° ☐

c)

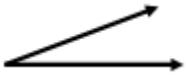


d)



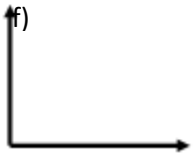
110°

e)



70°

f)



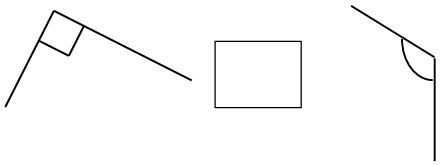
90°

3. Go over the answers to each angle with the pupils.
   (Answers: a) < b) > c) > d) < e) < f) =)

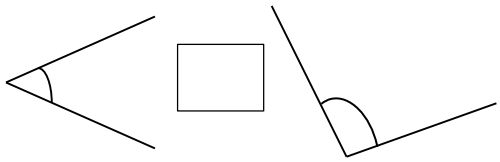
Independent Practice *(8 minutes)*

1. **Say:** Measure the angles using your protractor and compare them using the following symbols: **<**, **>**, or **=**
2. **Say:** Justify your answers by indicating whether the angels are acute, obtuse or right angles.

a)



b)



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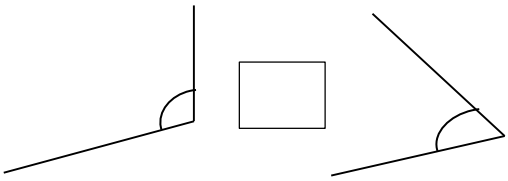
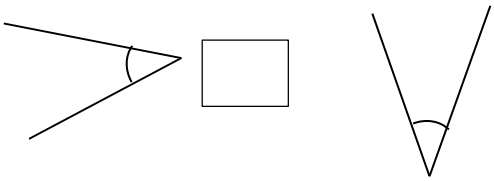


d)

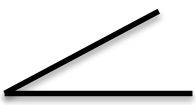


(Answers: a) < b) < c) > d) =)

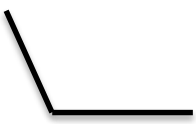
Closing *(5 minutes)*

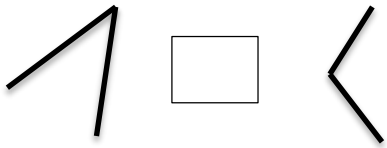
1. Draw the following angles on the board and ask pupils to compare the angles and indicate whether the angles are acute, obtuse or right angles.

a)



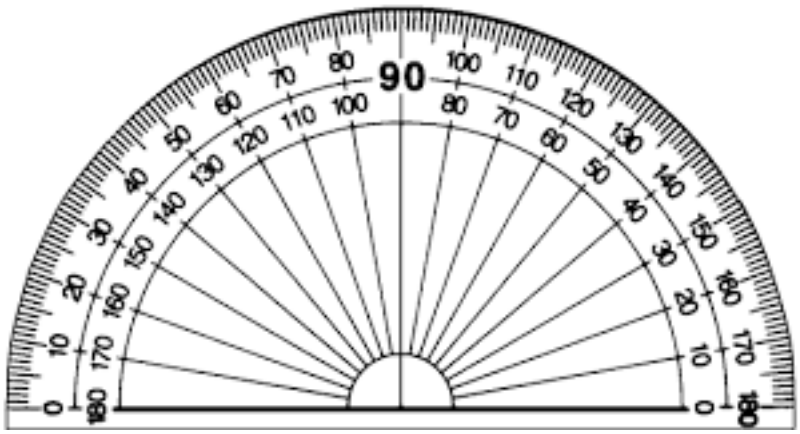
b)





(Answers: a) < b) <)

2. **Say**: Good work today, pupils. You have compared angles using greater than, less than and equal to signs.

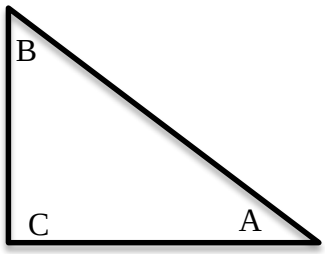


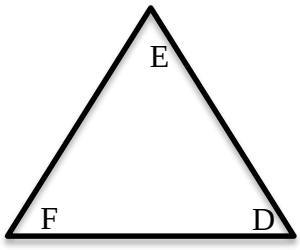
Lesson Title: Estimating Acute and Obtuse Angles Using Degrees	**Theme:** Geometry Angles	
Lesson Number: M-05-039	**Class/Level:** Class 5	**Time:** 35 minutes

Learning outcomes: By the end of the lesson, pupils will be able to estimate acute and obtuse angles using degrees.	**Teaching Aids** Protractor (See below for printable protractor)	**Preparation** Draw the triangles and angles on the board for the lesson.

Opening *(5 minutes)*

1. Draw the following triangles on the board. Put pupils in pairs.
2. **Say:** Use your protractor to measure the size of the angles in the triangles. Write down what kind of angle it is: Right, acute or obtuse.





(Answers: A = 45˚ acute B = 45˚ acute C = 90˚ right D = E =F = 60˚ acute)

3. **Say**: Today you will learn how to estimate acute and obtuse angles using degrees.

Introduction to the New Material *(8 minutes)*

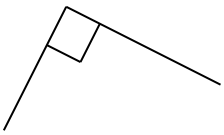
1. Ask pupils to work in pairs to sketch the following angles without using a protractor: 45˚, 90˚, 135˚.

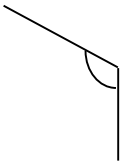
Answers:

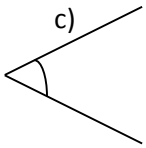
2. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.
3. Write the answers on the board and have pupils check their responses.
4. **Ask**: Why is this more difficult to do then measuring the angles with a protractor? Raise your hand to answer.
   (Example answers: it is difficult to be exact, the lines are not straight, I had to use 90 degrees and guess how to draw the other angle)
5. **Ask**: Which angle is the easiest to estimate? Raise your hand to answer.
   (Answer: The right angle is easiest because it is always 90 degrees.)

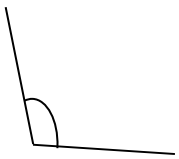
Guided Practice *(9 minutes)*

1. Draw the angles below on the board.
2. **Say**: Please put away your protractors, we will be using what you know about these angles and estimation to determine the value of the angles.
3. **Ask:** Are the following angles acute, obtuse or right angles?
   (Answers: a) right; b) obtuse; c) acute; d) obtuse)
4. **Ask:** Can you estimate the value of the angles? (Answers: a) 90˚ b) 120˚ c) 60˚ d) 95˚)

a) 

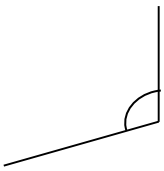
b) 

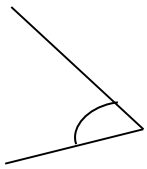
c) 

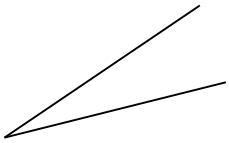
d) 

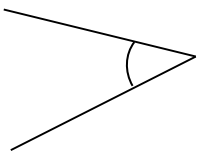
Independent Practice *(8 minutes)*

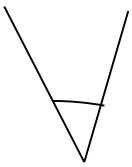
1. Draw the following angles on the board. Have pupils draw them in their notebooks.
2. **Ask:** Which of the following angles are acute, obtuse or right angles? And **say**: Work alone and estimate the value of each of the angles without using your protractors.
3. Write the answers in your notebooks.
   (Answer: a) obtuse, 100˚ b) acute, 60˚ c) acute, 15˚ d) acute, 55˚ e) acute, 30˚ f) obtuse, 170˚)

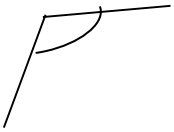
a) 

b) 

c) 

d) 

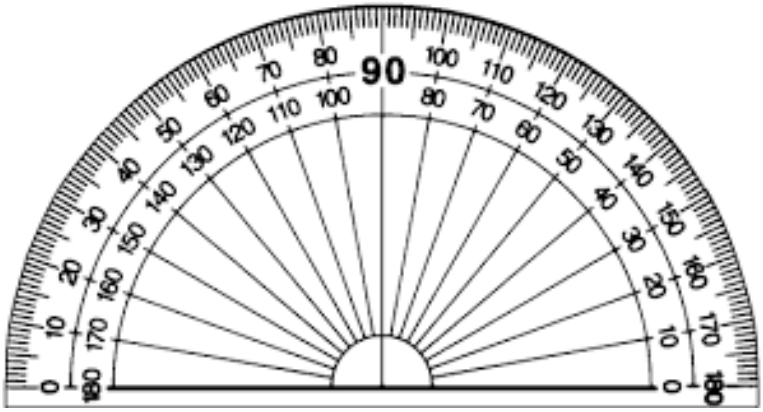
e) 

f) 

4. Invite pupils to the board to write their answers. Have pupils compare their answers to the answers on the board.

Closing *(5 minutes)*

1. Draw an example of an acute, obtuse and right angle. (Answer: answers will vary)
2. **Say:** Good job! You have done very well estimating angles today without using a protractor!


90
0
180

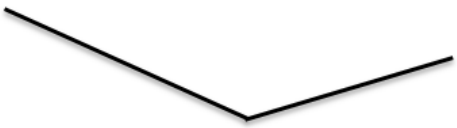
Lesson Title: Estimating Angles Up to 180 Degrees	**Theme:** Geometry Angles	
Lesson Number: M-05-040	**Class/Level:** Class 5	**Time:** 35 minutes

Learning outcomes: By the end of the lesson, pupils will be able to estimate angles up to 180 degrees.	**Teaching Aids** 1. Protractor (See below for printable protractor.) 2. Copies of the angles worksheet. (See below for worksheet to copy.)	**Preparation** Draw the angles on the board for the lesson or make copies of the worksheet at the end of the lesson.

Opening *(5 minutes)*

1. Give pupils a handout or draw with the following angles on the board.
2. **Say**: Use your protractor to measure the following angles:

a) 

b) 

(Example answers: a) 110˚ b) 160˚)

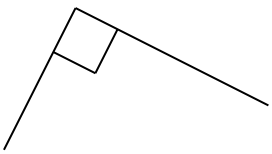
3. **Say**: Today you will learn how to estimate angles up to 180 degrees.

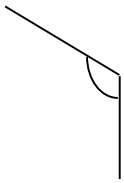
Introduction to the New Material *(8 minutes)*

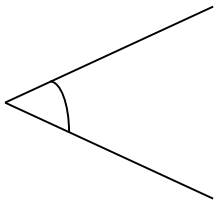
1. Draw the angles from exercise 2 on the board or give pupils a handout.
2. **Ask** pupils work in pairs to estimate the value of the angles in exercise 2. (Answers: a) about 55˚ b) about 70˚ c) about 130˚)
3. Ask some pupils for their answers. Have pupils check their answers.

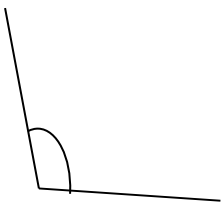
Guided Practice *(9 minutes)*

1. Put pupils in pairs.
2. Draw the angles from exercise 3 on the board or give pupils a handout.
3. **Ask** pupils to estimate the value of each of the following angles.

a) 

b) 

c) 

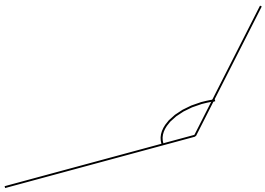
d) 

(Example answers: a) exactly 90 degrees; b) about 120 degrees; c) about 60 degrees; d) about 95 degrees)

Independent Practice *(8 minutes)*

1. **Say**: Draw the following angles in your notebook and estimate the value of each of the angles on your own.

a)



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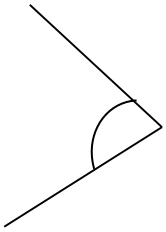

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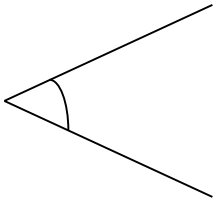

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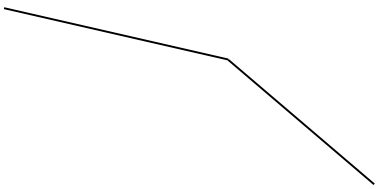

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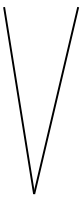

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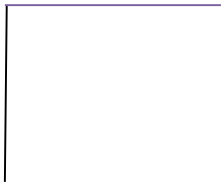
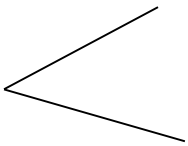


(Example answers: a) about 100 degrees b) about 60 degrees c) about 88 degrees d) about 170 degrees e) about 15 degrees f) about 175 degrees)

Closing *(5 minutes)*

Call pupils to the board to estimate the value of each of the following angles:

a)



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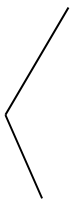
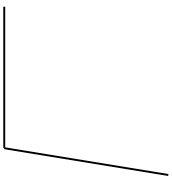


c)

d)



(Example answers: a) about 55 degrees b) about 150 degrees c) about 90 degrees d) about 95 degrees)

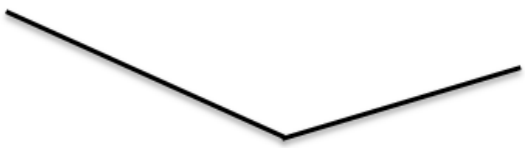
NAME_____ DATE_____

WORKSHEET M-05-040: ESTIMATING ANGLES

Exercise 1 for Opening

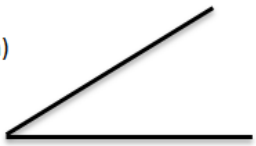
a)

b)

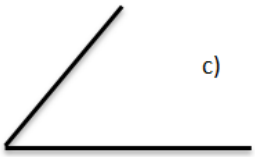


Exercise 2 for Guided Practice

a)



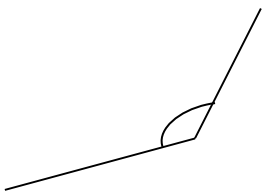
b)



c)

Exercise 3 for Independent Practice

a)



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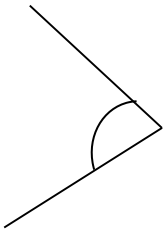

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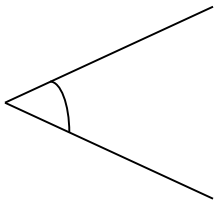

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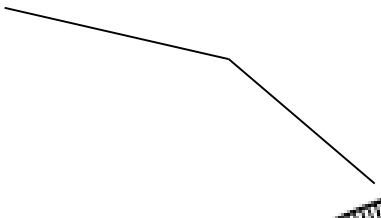

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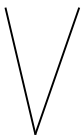

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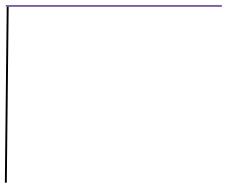

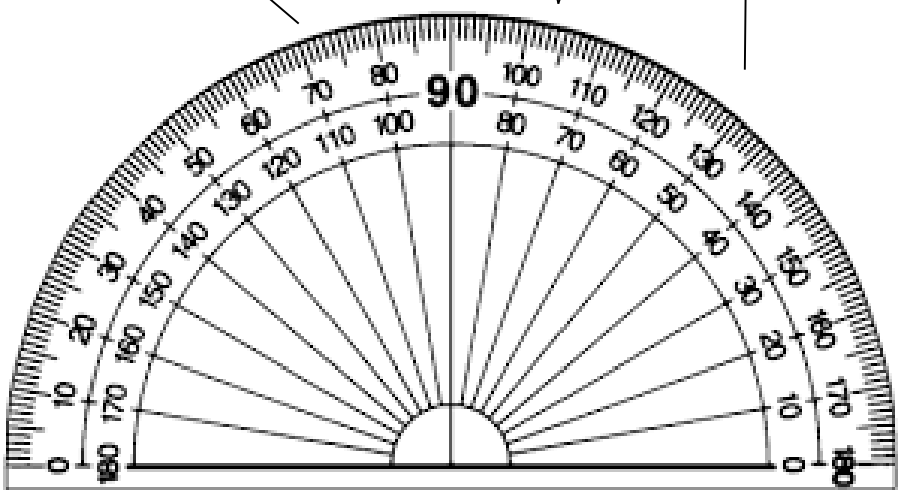

Lesson Title: Increasing Numbers with a Common Difference	**Theme:** Number Patterns	
Lesson Number: M-05-041	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of this lesson pupils will be able to: 1. Complete a sequence by adding the common difference. 2. Describe a rule for the sequence.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. **Say:** Count by 5s from 0 to 50. Raise your hand to answer.
   (Answer: 0, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50)
2. **Say:** Count by 10s from 200 to 300. Raise your hand to answer.
   (Answer: 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300)
3. **Say:** Count by 100s from 5,000 to 6,000. Raise your hand to answer.
   (Answer: 5,000, 5100, 5200, 5300, 5400, 5500, 5600, 5700, 5800, 5900, 6000)
4. **Say:** In this exercise you just created a sequence by adding the same number again and again.
5. **Say**: Today you will learn how to complete a sequence by adding a common difference and then write a rule to describe the sequence.

Introduction to the New Material *(12 minutes)*

1. Write**:** Find the missing numbers:
   a. 3,000, 4,000, 5,000, _____, _____, 8,000
2. Point to the sequence of numbers and **say:** These numbers form a sequence. A sequence is a list of numbers in a special order.
3. **Say:** Repeat 'sequence'.
4. **Say:** Each number in a sequence is a term. Repeat 'term'.
5. Point to '3000 'and **say:** This is the first term, point to '4000' and **say:** This is the second term, point to '5000' and **say:** This is the third term.
6. **Say:** Let's find the missing terms in this sequence. The first term is 3000, the second term is 4000, the third term is 5000. What is happening to the numbers? Raise your hand to answer. (Answer: Each term increases by 1000.)
7. **Ask:** So what do you think the next term will be? Raise your hand to answer. (Answer: 6000)
8. **Ask:** Why? (Answer: 5000 plus 1000 is 6000.)
9. **Ask:** What will be the next term after 6000? Raise your hand to answer. (Answer: 7000)
10. **Say:** This sequence is 3000, 4000, 5000, 6000, 7000, and 8000. If this sequence continued, what would the next term be? Raise your hand to answer. (Answer: 9000)
11. **Ask:** What term would come before the first term of the sequence? (Answer: 2000)
12. **Ask:** Why? (Answer: 3000 minus 1,000 is 2000.)
13. **Say:** So, when you are moving to the right, each term is 1000 more than the term before. When you are moving to the left, each term is 1000 less than the term before.

14. **Say:** Let's try another sequence.
15. Write**:** Find the missing terms: 34,500, 35,500, _____, 37,500, _____
16. **Ask:** What is happening to the numbers? Are they increasing or decreasing? Raise your hand to answer. (Answer: They are increasing.)
17. **Ask:** How are they increasing? Raise your hand to answer. (Answer: by 1000 each time)
18. **Say:** When we ask how they are increasing; we are writing the **rule** for the sequence. This is the way to find the value of each term.
19. **Say:** So what is the third term? Raise your hand to answer. (Answer: 36,500)

Guided Practice *(8 minutes)*

1. **Say**: Work with a partner to do the following:
2. Write**:** Find the missing numbers and write the rule.
    a. 4, 8, 12, 16, _____, 24, _____, _____
    (Answer: 20, 28, 32. Rule: Start at 4, then add 4 each time.)
    b. 2222, 3333, _____, _____, _____, 7777
    (Answer: 4444, 5555, 6666. Rule: Start at 2222, then add 1111 each time.)
    c. 84,399, 84,499, _____, 84,699, _____, _____
    (Answer: 84,599, 84,799 and 84,899. Rule: Start at 84,399, then add 100 each time.)
3. Invite pupils to come to the board to share their work.
4. **Say**: Compare your answer with the answers on the board.

Independent Practice *(9 minutes)*

1. **Say**: Answer these questions on your own.
2. Write**:** Find the missing terms and write the rule for each sequence.

    a. 28, 33, 38, _____, _____,_____
    (Answer: 43, 48, 53. Rule: Start at 28, then add 5 each time.)
    b. 28,950, _____, 48,950, _____, 68,950, 78,950
    (Answer: 38,950 and 58,950. Rule: Start at 28,950, then add 10,000 each time.)
    c. 101, 109, 117, _____, _____,
    (Answer: 125, 133. Rule: Start at 101, then add 8 each time.)

4. Have pupils to exchange their notebooks and check each others work as you read the answers aloud.

Closing *(3 minutes)*

1. **Ask:** How do you find a missing term when you know the rule? Raise your hand to answer. (Answer: You add or subtract the common difference to find the missing terms.)
2. **Ask:** How do you find the rule in a sequence when you only know the terms? Raise your hand to answer. (Answer: You find the common difference that you add or subtract to find the other terms and write a rule from this.)

3. **Ask:** Do we always add to find the next term in a sequence? Raise your hand to answer. (Answer: No, sometimes you need to subtract if the missing term is before the number in the sequence.)
4. **Say:** Good job today! You now know how to find terms in a sequence using a common difference and you know how to write the rule for the sequence.

Lesson Title: Decreasing Number Patterns With a Common Difference	**Theme:** Number Patterns	
Lesson Number: M-05-042	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of this lesson pupils will be able to: 1. Complete a sequence by subtracting the common difference. 2. Describe a rule for the sequence.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. Write**:** What is the rule for the following sequence?
    a. 45, 50, 55, 60, 65, 70 (Answer: Start at 45, then add 5 each time.)
    b. 45,800, 46,800, 47,800, 48,800, (Answer: Start at 45,800, then add 1000 each time.)
2. **Say:** Do we always add to find the next term in the sequence?
3. **Say**: Today you will learn how to complete a sequence by subtracting a common difference and then you will write the rule for it.

Introduction to the New Material *(12 minutes)*

1. Write**:** Find the missing terms:
    a. 10, 9, 8, _____, _____, _____, 4
2. **Say:** Let's find the missing terms. The first term is 10, the second term is 9, the third term is 8. What is happening to the terms? Raise your hand to answer. (Answer: Terms decrease by 1 each time.)
3. **Ask:** What will the next term be? Raise your hand to answer. (Answer: 7)
4. **Ask:** Why? Raise your hand to answer. Raise your hand to answer. (Answer: 8 minus 1 is 7.)
5. **Ask:** So what will be the next term after 7, explain your reasoning? Raise your hand to answer. (Answer: 6, because 7 minus1 is 6)
6. **Say:** This sequence is 10, 9, 8, 7, 6, 5, 4. What would the next term be if the sequence continued? Raise your hand to answer. (Answer: 3)
7. **Say:** Yes, that is correct because 4 minus 1 is 3.
8. **Ask:** What would the term be before the first term of this sequence? (Answer: 11)
9. **Ask:** Why? Raise your hand to answer. (Answer: 11 is 1 more than 10.)
10. **Say:** When you are moving to the right, each term is 1 less. If you are moving to the left, each term is 1 more.
11. **Say:** Let's try another sequence.
12. Write**:** Find the missing terms: 94, 90, _____, 82, 78, _____
13. **Ask:** What is happening to the numbers? Are they increasing or decreasing? Raise your hand to answer. (Answer: They are decreasing.)
14. **Ask:** By how much are they decreasing? Raise your hand to answer. (Answer: 4)
15. **Ask:** So what is the third term and how do you know? Raise your hand to answer. (Answer: 86, because 90 minus 4 is 86)

Guided Practice *(8 minutes)*

1. **Say**: Work with a partner to do the following problems.
2. Write**:** Find the missing terms and write the rule for each of the following:
    a. 5000, 4500, 4000, _____, _____
    (Answer: 3500, 3000. Rule: Start at 5000, then subtract 500 each time.)
    b. 100, 85, 70, _____, _____, _____, 10
    (Answer: 55, 40, 25. Rule: Start at 100, then subtract 15 each time.)
    c. 49, 42, _____, 28, _____, _____
    (Answer: 35, 21,14. Rule: Start at 49, then subtract 7 each time.)
3. Invite pupils to come to the board to show their work.
4. **Say**: Compare your answers to the answers on the board.

Independent Practice *(9 minutes)*

1. **Say**: Solve these problems on your own.
2. Write**:** Find the missing terms and write the rule for each of the following:

    a. 47,900, _____, 47,700, 47,600, _____
    (Answer: 47800, 47500. Rule: Start at 47900, then subtract 100 each time.)
    b. 578, 568, _____, _____, 538, 528
    (Answer: 558 and 548. Rule: Start at 578, then subtract 10 each time.)
    c. 90000, 89500, 89000 _____, _____
    (Answer: 88,500, 88,000. Rule: Start at 90,000, then subtract 500 each time.)

3. Make sure pupils understand and are doing the task.
4. Have pupils to exchange their notebooks and check each other's work as you read the answers aloud.

Closing *(3 minutes)*

1. **Ask:** Look at the examples we worked on today. What do you notice about the sequences as you move to the right? Raise your hand to answer.
    (Answer: Each term decreases by the same amount.)
2. **Say:** Let's note some examples from our classwork.
3. Point to any sequence on the board that moves to the right and subtracts the same amount.
4. **Ask**: What do you notice about the sequences as you move to the left? Raise your hand to answer. (Answer: Each term increases by the same amount.)
5. **Say:** Let's note some examples from our classwork.
6. Point to any sequence on the board that moves to the left and adds the same amount.
7. **Say**: Good job today pupils! You now know how to find terms in a sequence by subtracting and writing a rule for the sequence.

Lesson Title: Multiplication in Number Patterns with a Common Number	**Theme:** Number Patterns	
Lesson Number: M-05-043	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of this lesson pupils will be able to: 1. Complete a sequence by multiplying with a common number. 2. Describe a rule for the sequence.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. **Say:** Say your times tables from 2s through 10s.
2. **Say: T**ake the number 5 and write it down. Now let's multiply it by 2. Raise your hand to answer. (Answer: 10)
3. Write: 5, 10 and **say**: let's keep going and multiply 10 by 2 now. What is the answer? Raise your hand to answer. (Answer: 20)
4. Write: 5, 10, 20 and **say**: there is a pattern here that we are going to explore today.
5. **Say**: For the past few lessons, you have added and subtracted to find terms in a sequence. Today you will learn how to complete a sequence by multiplying a common number and then you will write a rule for it.

Introduction to the New Material *(12 minutes)*

1. Write**:** Find the missing terms:
    a. 2, 4, 8, _____, _____, _____
2. **Say:** Let's find the missing terms. The first term is 2, the second term is 4, the third term is 8. What is happening to the numbers? Raise your hand to answer. (Answer: Each number is multiplied by 2.)
3. **Ask:** What do you think the next term will be? Raise your hand to answer. (Answer: 16)
4. **Ask:** Why? (Answer: 8 x 2 is 16)
5. **Ask:** What will be the next term after 16and why? Raise your hand to answer. (Answer: 32 because 16 x 2 is 32)
6. **Ask:** What will be the next term after 32 and why? Raise your hand to answer. (Answer: 64 because 32 x 2 = 64)
7. **Say:** This sequence is 2, 4, 8, 16, 32, and 64. If the sequence continued, that would the next term be? Raise your hand to answer. (Answer: 128)
8. **Ask:** Why? (Answer: 64 x 2 is 128)
9. **Say:** So, when you are moving to the right, each term is the previous term multiplied by 2. When you are moving to the left, each term is the pervious term divided by 2.

10. **Ask:** If there was another term before the 2, what would the term be? Raise your hand to answer. (Answer: 1 because 2 ÷ 2 is 1)
11. **Say:** Let's try another sequence.
12. Write**:** Find the missing terms: 10, 100, 1000, _____, _____, _____
13. **Ask:** What is happening to the terms? Are they increasing or decreasing? Raise your hand to answer. (Answer: They are increasing.)
14. **Ask:** How are they increasing? Raise your hand to answer. (Answer: Each term is the previous term multiplied by 10)
15. **Say:** So what is the fourth term? Raise your hand to answer. (Answer: 10,000)

Guided Practice *(8 minutes)*

1. **Say**: Work with a partner to do the following problems.
2. Write**:** Find the missing terms and write the rule for each sequence:
    a. 3, 15, 75, _____, _____
    (Answer: 375 and 1875. Rule: Start with 3, then multiply by 5 each time.)
    b. 4, 24, 144, _____, _____
    (Answer: 864 and 5,184. Rule: Start at 4, and then multiply by 6 each time.)
3. Invite pupils to come to the board to show their work.
4. **Say**: Compare your answers to the answers on the board.

Independent Practice *(9 minutes)*

1. **Say**: Solve the problems on your own.
2. Write**:**

    a. Choose a number between 1 and 10.Write a sequence of 5 terms using the rule: Start at your number, then multiply by 10.
    (Example answers: 2, 20, 200, 2000, 20000, or 4, 40, 400, 4000, 40,000)
    b. Choose a number between 1 and 5.Write a sequence of 4 terms using the rule: Start at your number, then multiply by 7.
    c. Find the missing terms and the rule for the following sequences:
    ____, 5, 25, 125, _____
    (Answer: 1, 625. Rule: Start at 1, then multiply by 5 each time.)
    3, 9, _____, 81, 243, _____
    (Answer: 27, 729. Rule: Start at 3, then multiply by 3 each time.)
6. Make sure pupils understand and are doing the task.
7. **Say**: Exchange your notebooks and mark your work while I read the answers aloud.

Closing *(3 minutes)*

1. Write the following on the board:
    a. Start with the number 80.Write a sequence of 3 terms using the rule:
    Start at your number, then multiply by ½.

2. **Say**: Let's do this together. 80 times ½ is 40. 40 times ½ is 20. The last term is 20 times ½ which is 10.
3. Write: 80, 40, 20, 10
4. **Ask**: What do you notice about the terms in the sequence? Raise your hand to answer. (Example answers: they are decreasing; they are dividing in half; it is not multiplication)
5. **Say**: Yes, the numbers are decreasing by a common factor. They are being divided by 2 which is the same as multiplying by ½. We will explore this further in the next lesson.

Lesson Title: Division in Number Patterns by a Common Number	**Theme:** Number Patterns	
Lesson Number: M-05-044	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of this lesson pupils will be able to: 1. Complete a sequence by dividing by a common number. 2. Describe a rule for the sequence.	None	None

Opening *(4 minutes)*

1. **Say:** Let's take a large number like 400. Now we are going to divide it half. What is the result? Raise your hand to answer. (Answer: 200)
2. **Say**: Let's do it again. What is the result? Raise your hand to answer. (Answer: 100)
3. Write the following on the board:
   400, 200, 100
4. There is a pattern that you can see in this sequence and today we will explore this.
5. **Say:** Today you will learn how to complete a sewuence by dividing by a common number and you will describe a rule for the sequence.

Introduction to the New Material *(10 minutes)*

1. Write**:** Find the missing terms:
   a. 10,000, 1000, 100_____, _____
2. **Say:** Let's find the missing terms. The first term is 10,000, the second term is 1000, the third term is 100. What is happening to the numbers? Raise your hand to answer.
   (Answer: Each term is divided by 10 each time.)
3. **Ask:** So what do you think the next term will be? Raise your hand to answer. (Answer: 10)
4. **Ask:** Why? Raise your hand to answer. (Answer: 100 divided by 10 is 10)
5. **Ask:** What will be the next term after 10? Raise your hand to answer. (Answer: 1)
6. **Ask:** Why? Raise your hand to answer. (Answer: 10 divided by 10 is 1)
7. **Say:** So this sequence is 10,000, 1000, 100, 10, 1.
8. **Say:** When you move to the right, each term is the previous term, divided by 10. When you move to the left, each term is the previous term, times 10.
9. **Say:** Let's try another sequence.
10. Write**:** Find the missing terms: 5000, 1000, 200, _____, _____
11. **Ask:** What is happening to the numbers? Are they increasing or decreasing? Raise your hand to answer. (Answer: They are decreasing.)
12. **Ask:** How are they decreasing? Raise your hand to answer.
    (Answer: Each term is divided by 5 each time.)
13. **Say:** So what is the fourth term? Raise your hand to answer. (Answer: 40)

14. **Ask:** Why? Raise your hand to answer. (Answer: 200 divided by 5 is 40)
15. **Say:** So what is the fifth term? Raise your hand to answer. (Answer: 8)
16. **Ask:** Why? Raise your hand to answer. (Answer: 40 divided by 5 is 8)

Guided Practice *(8 minutes)*

1. **Say**: Work with a partner to solve the problems.
2. Write**:**
    a. Find the missing numbers and write the rule:
    70,000, ____, 700, _____, _____
    (Answer: 7000, 70, 7. Rule: Start at 70,000, then divide by 10 each time.)
    b. What is the rule for this sequence?
    256, 128, 64, 32, 16, 8, 4, 2
    (Answer: Start at 256, then divide by 2 each time.)
3. Invite pupils to come to the board to share their work.
4. Ask pupils to compare their answers to the answers on the board.

Independent Practice *(8 minutes)*

1. **Say**: Solve these problems on your own.
2. Write**:** Find the missing terms and rule:
    a. 729, 243, 81, ____, _____, 3, _____
    (Answer: 1, 9, 27. Rule: Start at 729, and then divide by 3 each time.)
    b. 3125, 625, 125, _____, _____
    (Answer: 25, 5. Rule: Start at 3125, and then divide by 5 each time.)
3. Make sure pupils understand and are doing the task.
4. **Say**: Exchange your notebooks and mark your work while I read the answers aloud.

Closing *(5 minutes)*

1. Write the number 40 on the board.
2. **Say**: Let's take this number and write 4 different sequences with 4 terms each using all 4 operations. Let's use the common number of 2 and write each rule.
3. Give pupils 2 minutes to complete this.
4. **Say**: Raise your hand to answer.
    a. Answer for Addition: 40, 42, 44, 46; Rule for Addition: Start with 40, add 2 each time.
    b. Answer for Subtraction: 40, 38, 36, 34; Rule for Subtraction: Start with 40, subtract 2 each time.
    c. Answer for Multiplication: 40, 80, 160, 320; Rule for Multiplication: Start with 40, multiply 2 each time.
    d. Answer for Division: 40, 20, 10, 5; Rule for Addition: Start with 40, divide by 2 each time.
5. **Say**: Good job today pupils! You have now completed sequences and written their rules for all four operations. We will explore this more in the next lesson.

Lesson Title: Completing Sequences Using the 4 Operations	**Theme:** Number Patterns	
Lesson Number: M-05-045	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to complete a sequence using the four operations.	 **Teaching Aids** None	 **Preparation** Write the sequence problems in the guided practice and independent practice on the board.

Opening *(3 minutes)*

1. **Say:** Count by 5s from 0 to 50. (Answer: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50)
2. **Say:** Count backwards by 2s from 20 to 0. (Answer: 20, 18, 16, 14, 12, 10, 8, 6, 4, 2, 0)
3. **Say:** Count by 2s from 11 to 25. (Answer: 11, 13, 15, 17, 19, 21, 23, 25)
4. **Say:** Count backwards by 3s from 58 to 40. (Answer: 58, 55, 52, 49, 46, 43, 40)
5. **Say**: Today you will learn how to complete a sequence using all four operations.

Introduction to the New Material *(8 minutes)*

1. **Say:** Let's find the rule for the following sequence:
2. Write**:** Find the rule for the following sequence:
    a. 37, 39, 44, 46, 51, 53, 58
3. **Ask:** Is the sequence increasing or decreasing? Raise your hand to answer. (Answer: Increasing)
4. **Ask:** How is it increasing between the first and second term? Raise your hand to answer. (Answer: It goes up by 2.)
5. **Ask:** How is it increasing between the second and third term? Raise your hand to answer. (Answer: It goes up by 5.)
6. **Ask:** How is it increasing between the third and fourth term? Raise your hand to answer. (Answer: It goes up by 2.)
7. **Ask:** How is it increasing between the fourth and fifth term? Raise your hand to answer. (Answer: It goes up by 5.)
8. **Ask:** What is happening? Raise your hand to answer. (Answer: It goes up by 2, then 5, then 2, then 5).
9. **Ask:** So what is the rule? Raise your hand to answer. (Answer: Rule: Start with 37. Add 2, then add 5, then repeat those two steps.)
10. **Say:** That is an example of a rule for a sequence that has more than one step.
11. **Say:** Now we will do the following in our exercise books.

Guided Practice *(10 minutes)*

1. **Say:** Work with your partner. Copy and solve the problems in your exercise books.
2. Write**:** Find the missing numbers and the rule for the following:
    a. 5, _____, 500, _____, _____
    (Answer: 50, 5000, 50,000. Rule: Start at 5, then multiply by 10 each time.)
    b. 2, 4, 7, 9, 12, 15, _____, _____, _____

(Answer: 8, 10, 12. Rule: Start at 2, add 2, then add 5, then repeat those two steps)

c. 1, _____, 9, 27, _____, _____
(Answer: 3, 81, 243. Rule: Start at 1, then multiply by 3 each time.)

3. Write**: '**Find the rule for the following sequences:'
    a. 789, 778, 767, 756, 745, 734, 723
    (Answer: Start at 789, then subtract 11 each time.)
    b. 90,000, 9000, 3000, 300, 100, 10
    (Answer: Start at 90,000, then divide by 10, then divide by 3, then repeat those two steps.)
    c. 58, 51, 44, 37, 30, 23 (Answer: Start at 58, then subtract 7 each time.)
    d. 456, 468, 480, 492, 504, 516 (Answer: Start at 456, then add 12 each time.)
4. Invite pupils to come to the board to share their work.

Independent Practice *(10 minutes)*

1. **Say:** Copy and complete the following on your own in your exercise books.
2. Write**:** Find the missing numbers and write the rules.
1. 5, _____, 500, _____, _____
(Answer: 50, 5000, 50,000. Rule: Start at 5, then multiply by 10 each time.)
    a. 75, 65, _____, _____, 35, _____
    (Answer: 55, 45, 25. Rule: Start at 75, then subtract 10 each time.)
    b. 1024, 512, _____, 128, _____, _____
    (Answer: 256, 64, 32. Rule: Start at 1024, then divide by 2 each time.)
    c. 84, 81, 85, 82, 86, _____, _____, _____
    (Answer: 75, 72, 69. Rule: Start at 84, then subtract 3, then add 4, repeat those two steps.)
3. Write**: '**Find the rules for the following:'
    a. 1, 10, 100, 1000, 10,000
    (Answer: Rule: Start at 1, multiply by 10 each time.)
    b. 6, 7, 9, 12, 16, 21, 27
    (Answer: Rule: Start at 6, then add 1, then add 2, then add 3. Continue increasing the number added by one each time.)
4. Make sure pupils understand and are doing the task.
5. **Say**: Exchange your notebooks and check each other's work while I read the answers aloud

Closing *(4 minutes)*

1. **Say**: Create a sequence and write the rule for the sequence. You must do the following:
    a. Write at least 8 terms in your sequence.
    b. Use at least 2 different operations.
    c. Clearly state the rule for the sequence.
2. Give pupils 2 minutes to create their sequence.
3. **Say**: Show your partner your sequence and see if they can determine the rule for your sequence and then find the rule for their sequence.
4. **Say**: Good job pupils! You can now complete sequences using all 4 operations!

Lesson Title: Revision of Multiplication Tables Up to 12	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-046	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to identify and use multiplication tables up to 12.	 **Teaching Aids** 12 by 12 Multiplication Chart	 **Preparation** 1. Create a 12 by 12 multiplication chart for the whole class. (Either write it on the board or copy it for the pupils to have.) 2. Draw or photocopy the charts in the lesson.

Opening *(5 minutes)*

Note: If you cannot make the chart before class, draw the table on the board and ask pupils to say the times table as you write them in the table.

x	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

1. Look at the table on the board and ask pupils to say the times table as you write them in the table.
2. **Say:** This is a 12 by 12 multiplication chart. It shows the product when numbers from 1 to 12 are multiplied by each other. For example, 2 times 3 has the product 6.
3. Show pupils how the chart works. Point to 2 in the first column, then point to 3 in the first row. Move your hand across from the 2 and then move the other hand down from the 3. Stop both hands at the square where the two paths meet, at the product 6.
4. **Ask:** What is a product? Raise your hand to answer.

(Answer: A product is the number you get when you multiply two numbers.)

5. **Say**: Today you will learn how to identify and use the multiplication tables up to 12.

Introduction to the New Material *(8 minutes)*

x	4	5	6	7	10
1	a				
2		b		c	
3					
4			d		e

1. Write: Find the products a, b, c, d, and e in the chart above.
2. **Say:** The multiplication sign in the top left corner of the multiplication chart tells us that we are multiplying the numbers in the first column with the numbers in the first row.
3. **Say:** Write 'multiplication chart' as a new vocabulary word in your exercise books.
4. Write**:** A multiplication chart is a table with rows and columns that shows you the result of multiplying two numbers.
5. **Say:** Now let's find 'a'. To find 'a', we multiply 1 and 4.
6. Show pupils 1 in the first row and 4 in the first column. Show where the two paths meet on the product 4.
7. **Ask:** What is 1 times 4? Raise your hand to answer. (Answer: 4)
8. In the place of 'a' write**:** 4
9. **Say:** Now let's find 'b'. How do we find 'b'? Raise your hand to answer. (Answer: 2 x 5)
10. **Ask:** What is the answer? Raise your hand to answer. (Answer: 10)
11. In the place of 'b', write**:** 10.
12. **Say**: In the same way, find 'c', 'd', and 'e'. Raise your hand to answer.
    (Answers: c =14, d=24, e=40)

Guided Practice *(8 minutes)*

1. **Say:** Copy and complete the following multiplication chart in your exercise books with your partner.

x	2	6	7	10	11
2					
4					
6					
8					

2. Invite pupils to come to the board to show their work. (Answers: See chart below.)

x	2	6	7	10	11
2	4	12	14	20	22
4	8	24	28	40	44
6	12	36	42	60	66
8	16	48	56	80	88

Independent Practice *(10 minutes)*

1. **Say:** Copy and complete the following multiplication chart on your own in your exercise books.

x	7	8	9	11	12
3					
5					
7					
11					

2. **Say**: What is 3 times 7? Raise your hand to answer. (Answer: 21)
3. Write: 21 in the chart.
4. Continue asking pupils to complete the chart. (Answers: See chart below.)

x	7	8	9	11	12
3	21	24	27	33	36
5	35	40	45	55	60
7	49	56	63	77	84
11	77	88	99	121	132

5. **Say**: Exchange your notebooks to check each other's work while I read the answers aloud.

Closing *(4 minutes)*

1. **Ask:** What is a product? Raise your hand to answer.
   (Answer: it is the number you get when you multiply two numbers together.)
2. **Ask:** What process do you do to use the multiplication chart to find a product? Raise your hand to answer. (Answer: You move your finger across a row and down a column and the point where they meet is a product of the two numbers you started at.)
3. **Ask:** What is the product of 4 and 12? Raise your hand to answer. (Answer: 48)
4. **Say:** Give an example from today of multiplying two numbers to find their product. Raise your hand to answer. (Example answers: the product of 5 and 8 is 40, the product of 11 and 7 is 77.)

Lesson Title: Multiplication by 1 and 0	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-047	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to multiply by 1 and 0.	**Teaching Aids** 12 by 12 Multiplication Chart	**Preparation** Create a 12 by 12 multiplication chart with a zero column added in for the whole class.

Opening *(5 minutes)*

Note: If you cannot make the chart before class, draw the table on the board and ask pupils to say the times table as you write them in the table.

x	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

1. **Ask:** What is this chart called? Raise your hand to answer. (Answer: multiplication chart)
2. **Ask:** What can it be used to do? Raise your hand to answer. (Answer: It can be used to find the product of multiplying two numbers from 0 to 12)
3. **Ask:** What is a product? Raise your hand to answer. (Answer: A product is the result when you multiply two numbers.)
4. **Say**: Today you will learn how to multiply by 1 and 0.

Introduction to the New Material *(10 minutes)*

1. Point to the 1s column.

2. S**ay:** Together, let's say our times tables for 1.
3. **Say with pupils:** 1 x 1 is 1, 1 x 2 is 2, 1 x 3 is 3
4. Continue multiplying by 1 with pupils up to 12
5. **Ask:** What is happening to the numbers? Raise your hand to answer. (Answer: The product is the same as the number multiplied by 1)
6. **Ask:** What is 1 x 1000? (Answer: 1000)
7. **Say:** So what happens when you multiply a number by 1? Raise your hand to answer. (Answer: The product is the number.)
8. **Say:** Look down the zero column and the zero row on the chart. Do you see a pattern? Raise your hand to answer. (Answer: Yes, the numbers are all zero.)
9. **Say:** Let's think about what that means in terms of repeated addition.
10. **Say:** If I have 2, 3 times, what does that mean? Raise your hand to answer. (Answer: It means you have 2 + 2 + 2, which is 6.)
11. Write this on the board as you say it out loud: 2 + 2 + 2 = 6
12. **Say:** Is that true? Raise your hand to answer. (Answer: yes)
13. **Say:** So if I have 0, 3 times, that will be 0 + 0 + 0
14. Write this on the board as you say it out loud: 0 + 0 + 0 = 0
15. **Say:** As you can see, any multiple of 0 is 0. That means that you can multiply 0 by any number and the resulting product will always be zero.
16. **Ask:** So what is 7, 0 times? Write this out like I did on the board. Raise your hand to answer. (Answer: 0)
17. **Ask:** What is 34 times 0? Raise your hand to answer. (Answer: 0)
18. **Ask:** So what happens when you multiply any number by 0? Raise your hand to answer. (Answer: The product is always 0)

Guided Practice *(9 minutes)*

1. **Say:** Copy and complete the following multiplication chart in your exercise books with your partner.

x	**0**	**1**	**5**	**10**
2				
5				
10				
1,000				

2. **Say**: Raise your hands to offer an answer.
   Answers:

x	**0**	**1**	**5**	**10**
2	0	2	10	20
5	0	5	25	50
10	0	10	50	100
1,000	0	1,000	5,000	10,000

Independent Practice *(8 minutes)*

1. Write**:** Copy and complete the following on your own in your exercise books**:**
    a. _____ x 24 = 0 (Answer: 0)
    b. 17 x _____ = 17 (Answer: 1)
    c. 12,500 x 0 = ____ (Answer: 0)
    d. _____ x 36 = 0 (Answer: 0)
    e. 10000 x 1 = ____ (Answer: 10000)
    f. 0 x 25012 = ____ (Answer: 0)
2. **Say**: Raise your hands to offer an answer.
3. Write the answers on the board as you call on pupils.

Closing *(3 minutes)*

1. **Ask:** When you multiply any number by 0 what is your result? Raise your hand to answer. (Answer: 0)
2. **Ask:** Does it matter how big the number is? Raise your hand to answer. (Answer: no)
3. **Ask:** So what is a million x 0? Raise your hand to answer. (Answer: 0)
4. **Say:** Now let's look at multiplying by 1**. Say:** 5 x 1 = 5 and 200,000 x 1 = 200,000.
5. **Ask:** What happens when you multiply a number by 1? Raise your hand to answer. (Answer: The product is the same as the number you multiplied 1 by.
6. **Say:** Good job today pupils! Today you learnt the rules for multiplying numbers by 1 and 0

Lesson Title: Multiplication by 3-Digit Numbers Using Non-Formal Methods	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-048	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to multiply 1-digit by 3-digit numbers using non-formal methods.	 **Teaching Aids** None	 **Preparation** None

Opening *(4 minutes)*

1. **Say:** Solve the following in your exercise books.
2. **Say:** Write the following in expanded form:
    a. 245 (Answer: 200 + 40 + 5)
    b. 829 (Answer: 800 + 20 + 9)
    c. 302 (Answer: 300 + 2)
    d. 111 (Answer: 100 + 10 + 1)
3. **Say**: Today you will learn how to multiply 3-digit numbers using the non-formal method of expansion.

Introduction to the New Material *(9 minutes)*

1. **Say:** Together, let's find the product of 204 x 3. Copy the work into your exercise books as we complete the exercise together.
2. **Say:** First, let's expand 204. What is the expanded form of 204? Raise your hand to answer. (Answer: 200 + 4)
3. **Say** and write**:** We can rewrite 204 x 3 as (200 + 4) x 3.
4. **Say** and write**:** Next, we distribute the multiplication to each part of the expanded form. Then we solve each part.

    204 x 3
    = (200 + 4) x 3
    = (200 x 3) + (4 x 3)
    = 600 + 12
    = 612
5. Point and **say**: After we expanded the problem and multiplied each part by 3, we added the parts back together to find the answer of 612.
6. Write**:** Let's solve 549 x 8.
7. **Say** and write**:**

    549 x 8
    = (500 + 40 + 9) x 8
    = (500 x 8) + (40 x 8) + (9 x 8)
    = 4000 + 320 + 72
    = 4,320 + 72
    = 4392

8. Point and **say**: After we expanded the problem and multiplied each part by 8, we added the parts back together to find the answer of 4392.

Guided Practice *(9 minutes)*

1. **Say:** Work with your partner in your exercise books to solve the following problems.
2. Write**:** Use the expanded form to find the products of the following (write the problem without the answer):
    a. 294 x 7
    (Answer: (200 + 90 + 4) x 7 = (200 x 7) + (90 x 7) + (4 x 7) = 1400 + 630 + 28 = 2058)
    b. 925 x 12
    (Answer: (900 + 20 + 5) x 12 = (900 x 12) + (20 x 12) + (5 x 12) = 10,800 + 240 + 60 = 11,100)
    c. 777 x 8
    (Answer: (700 + 70 +7) x 8 = (700 x 8) + (70 x 8) + (7 x 8) = 5600 + 560 + 56 = 6216)
3. Walk around the room. Discuss answers with pupils and assist when pupils need help.
4. Invite pupils to come to the board to share their work.
5. **Say:** Check your work and make corrections as the pupils answer the problems at the board.

Independent Practice *(8 minutes)*

1. Write**:** Use the expanded form to solve the following on your own in your exercise books (write the problem without the answer)**:**
    a. 375 x 4
    (Answer: (300 + 70 + 5) x 4 = (300 x 4) + (70 x 4) + (5 x 4) = 1,200 + 280 + 20 = 1500)
    b. 993 x 8
    (Answer: (900 + 90 + 3) x 8 = (900 x 8) + (90 x 8) + (3 x 8) = 7200 + 720 + 24 = 7944)
    c. 119 x 11
    (Answer: (100 + 10 + 9) x 11 = (100 x 11) + (10 x 11) + (9 x 11) = 1100 + 110 + 99 = 1309)
    d. 801 x 12
    (Answer: (800 + 1) x 12 = (800 x 12) + (1 x 12) = 9600 + 12 = 9612)
2. Have pupils exchange their books and mark their work as you read the answers aloud.

Closing *(5 minutes)*

1. **Ask:** What is the expanded form of 101? Raise your hand to answer. (Answer: 100 + 1)
2. **Ask:** What is 101 x 0? Raise your hand to answer. (Answer: 0)
3. **Say:** Use expanded notation to show that the answer is 0. (Answer: (100 x 0) + (1 x 0) = 0 + 0 = 0)
4. **Ask:** What is 101 x 1? (Answer: 101)
5. **Say:** Use the expanded notation to show that the answer is 101. (Answer: (100 x 1) + (1 x 1) = 100 + 1 = 101)
6. **Say:** Good job today pupils! You have now learnt how to multiply 3- digit numbers using a new method!

Lesson Title: Recognising the Expression `Of` as Multiplication	**Theme:** Number Patterns	
Lesson Number: M-05-049	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will know to use multiplication for the term 'of' in math problems.	 **Teaching Aids** None	 **Preparation** Draw the chart in the introduction to the new material on the board.

Opening *(5 minutes)*

1. Review some multiplication facts with pupils.
2. **Ask**: What is 5 x 5? (Answer: 25)
3. **Ask**: What is 3 x 6? (Answer: 18)
4. **Ask**: What is 12 x 6? (Answer: 72)
5. **Ask**: What is 11 x 9? (Answer: 99)
6. **Ask**: What is 7 x 9? (Answer: 63)
7. **Say**: Today you will learn how to use multiplication when you see the word 'of' in a math problem.

Introduction to the New Material *(8 minutes)*

1. **Say:** We will now find different ways of showing 12 as multiplication.
2. **Say :** Draw 12 marks in your exercise books, like this.
3. Write**:** * * * * * * * * * * * *
4. **Say:** I will re-draw them, and I will put them into groups of equal number**.**
5. Write: * * * * * * * * * * * *
6. **Ask:** How many groups do I have? (Answer: 2)
7. **Ask:** How many are in each group? (Answer: 6)
8. **Say:** So we can say that 12 can be expressed as 2 groups **of** 6.
9. **Say:** With a partner, re-draw the marks. Put them in groups of equal number, but not 2 and
10. Invite pupils to come to the board to share their wok. (Possible answers in the chart below.)

6 groups of 2 6 x 2 = 12 ** ** ** ** ** **	2 groups of 6 2 X 6 = 12 ****** ******	3 groups of 4 3 x 4 = 12 **** **** ****	4 groups of 3 4 x 3 = 12 *** *** *** ***	* 12 groups * of 1 * * 12 x 1 = 12 * * * * * *	1 group of 12 1 x 12 = 12 **********

				*	

11. **Say:** So when we can show a number in equal groups, we can rewrite the number as a multiplication sentence. Look. For 12, we can have 6 groups of 2 as 6 x 2, 2 groups of 6 as 2 x 6, 3 groups of 4 as 3 x 4, 4 groups of 3 as 4 x 3, 12 groups of 1 as 12 x 1, 1 group of 12 as 1 x 12.
12. **Say:** So the word '**of**' can mean 'times' or multiplication.
13. **Say:** Let's try another example.
14. Write**:** Nina bought 5 juice packs of 4 bottles each. How many bottles of juice did she buy?
15. **Ask:** How many bottles are in a pack? Raise your hand to answer. (Answer: 4)
16. **Ask:** How many packs did Nina buy? Raise your hand to answer. (Answer: 5)
17. **Ask:** So how many bottles of orange juice did Nina buy? Raise your hand to answer. (Answer: 5 packs of 4 bottles each = 5 x 4 = 20, Nina bought 20 bottles.)
18. **Say:** Now you can see that the word 'of' in these two types of problems means that you multiply.

Guided Practice *(8 minutes)*

1. **Say:** Do the following in your exercise books with your partner.
2. Write**:** Solve the following problems:
    a. 7 groups of 8 = ? (Answer: 7 x 8 = 56)
    b. 10 groups of 4 = ? (Answer: 10 x 4 = 40)
    c. 5 groups of 9 = ? (Answer: 5 x 9 = 45)
    d. 11 groups of 2 = ? (Answer: 11 x 2 = 22)
    e. 59 groups of 1 = ? (Answer: 59 x 1 = 59)
3. Walk around the class. Make sure pupils understand and are doing the task. Assist pupils who need help.

Independent Practice *(12 minutes)*

1. Write**:** Do the following in your exercise books on your own:
    a. 100 groups of 5 = ? (Answer: 100 x 5 = 5)
    b. 1 group of 1000 = ? (Answer: 1 x 1000 = 1,000)
    c. 25 groups of 4 = ? (Answer: 25 x 4 = 100)
    d. Mrs. Brim bought apples in crates of 12. If she bought 4 crates of 12 apples each, how many apples did she buy?
    (Answer: 4 crate of 12 is 4 x 12 = 48 apples
    e. Arrange 24 dots into equal groups. Find two different groups that equal 24.
    (Some possible answers are in the table below.)

??????? ??????? ??????? ???????	??????????????? ???????????????	????????? ????????? ?????????	??????????????????????????????
4 groups of 6	*2 groups of 12*	*3 groups of 8*	*1 group of 24*
4 x 6 = 24	*2 x 12 = 24*	*3 x 8 = 24*	*1 x 24 = 24*

2. **Say**: Exchange your work and help each other if needed.

Closing *(2 minutes)*

1. **Ask:** How many groups of 1 can you divide 1 into? Raise your hand to answer. (Answer: 1 x 1 = 1)
2. **Say:** Yes, there is only one way to divide the number 1 up and that is in 1 group of 1 or 1 x 1 = 1

Lesson Title: Word Problems Using Multiplication of Whole Numbers	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-050	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to solve word problems involving multiplication of whole numbers.	 **Teaching Aids** None	 **Preparation** Draw or photocopy the table in the independent practice on the board.

Opening *(3 minutes)*

1. **Say:** Today you will learn how to solve word problems involving multiplication of whole numbers.
2. **Ask:** What is 10 groups of 5? Raise your hand to answer. (Answer: 10 x 5 = 50)
3. **Ask:** What is 0 groups of 20,000? Raise your hand to answer. (Answer: 0 x 20,000 = 0)
4. **Ask:** What is 5 groups of 200? Raise your hand to answer. (Answer: 5 x 200 = 1000)
5. **Say:** You have now solved a set of problems where you multiplied using whole numbers. We will now do the same thing using word problems.

Introduction to the New Material *(10 minutes)*

1. **Say:** Write the following in your exercise books.
2. Write**: '**If 1 egg costs Le 1,000, how much does a dozen eggs cost?'
3. **Ask:** How much does 1 egg cost? Raise your hand to answer. (Answer: Le 1000)
4. **Ask:** How many eggs make a dozen? Raise your hand to answer. (Answer: 12 eggs)
5. **Ask:** So how much does a dozen eggs cost? (Answer: 1000 x 12 = Le 12,000)
6. Write**: '**Mustapha has 12 Le 2000 bills in his pocket.'
7. **Say:** Let's break down the problem together to see how to solve it.
8. **Ask:** How many bills does Mustapha have? Raise your hand to answer. (Answer: 12 bills)
9. **Ask:** How much is each bill worth? Raise your hand to answer. (Answer: Le 2000 for each bill)
10. **Ask:** So how much money does Mustapha have? Raise your hand to answer. (Answer: 12 x Le 2000 = Le 24,000)

Guided Practice *(12 minutes)*

1. **Say:** Work with your partner to solve the following problems in your exercise books.
    a. 1 bread roll costs Le 1200. How much does a dozen rolls cost? (Answer: 12 x 1200 = Le 14,400)
    b. Ebun has 14 pairs of socks. How many socks does Ebun have? (Answer: 14 x 2 = 28 socks)
    c. Mrs. Folan bought 30 packets of biscuits for her end-of-year celebration with her class. If each packet costs Le 500, how much did she pay for the biscuits? (Answer: 30 x 500 = Le 15,000)

d. Mr. Abdul charges Le 10,000 per month to clean 1 house. If he cleans 15 houses per month, how much money does he make in 1 month?
(Answer: 10,000 x 15 = Le 150,000)

2. Invite pupils to come to the board to share their work.
3. **Say**: Check your work and make corrections if needed as pupils write their answers on the board.

Independent Practice *(8 minutes)*

1. Write**:** Copy and complete the following on your own in your exercise books:
    a. Ayesha's Restaurant orders supplies weekly from Mr. Hamid's shop. How much does Ayesha pay each week for each kind of supplies? How much does she pay in total each week?

Name of item	**Cost of item**	**Quantity per week**	**Total cost per week**
Smoked fish	Le 200	20	(Answer: Le 4000)
A litre of vegetable oil	Le 2000	5	(Answer: Le 10,000)
A litre of palm oil	Le 2500	6	(Answer: Le 15,000)
A pound of rice	Le 2200	50	(Answer: Le 110,000)
A bundle of cassava leaves	Le 1700	10	(Answer: Le 17,000)
A bundle of sweet potato leaves	Le 1000	20	(Answer: Le 20,000)

2. **Say**: Raise your hand to answer. I will write it on the board in the chart.
3. **Say**: Exchange your notebooks and check each other's work as I read the answers aloud.

Closing *(2 minutes)*

1. Write**:** If Mary buys Le 10,000 of phone credit a week, how much will she buy in one month?
2. **Say:** What steps do you take to solve this problem? Write down your steps and the mathematical expression you need to solve the problem.
3. **Say:** Raise your hand to tell me one of the steps you need to do to solve this problem.
4. After you call on a few pupils and write down their answers, solve the problem. (Answer: Le 10,000 x 4 weeks = Le 40,000)

5. **Say**: Good job pupils! Today you learnt how to solve word problems with multiplying whole numbers.

Lesson Title: Revision of Division Tables Up to 5	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-051	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to identify and use division tables up to 5.	**Teaching Aids** None	**Preparation** Draw the division tables from the lesson on the board.

Opening *(5 minutes)*

1. Write and **say**: Solve the following problems:
   a. 24 x 3 = (Answer: 72)
   b. 37 x 4 = (Answer: 148)
   c. 75 x 2 = (Answer: 150)
   d. 30 x 5 = (Answer: 150)
   e. 12 x 5 = (Answer: 60)
2. **Say:** Raise your hand to answer.
3. Write the answers on the board as pupils say them aloud.
4. **Ask**: Can you see two numbers that have the same answer? Raise your hand to answer. (Answer: c and d both have an answer of 150)
5. **Say:** We are going to explore division tables to see a pattern for division and multiplication for numbers up to 5.
6. **Say**: Today you will learn how to identify and use division tables up to 5

Introduction to the New Material *(5 minutes)*

1. Draw a division table on the board. Introduce the pupils to using a division table.

÷	60	72	120	148	150
2	30	36	60	74	75
3	20	24	40	**X**	50
4	15	18	30	37	**X**
5	12	**X**	24	**X**	30

2. **Say**: We are going to use this division table to find the results of dividing one number by another number.
3. **Say**: So find 60 in the first column. Find 2 in the first row. Look down from the 60 and across from the 2 to where the paths meet at the answer to 60 ÷ 2
4. **Ask**: What is the answer to 60 ÷ 2? Raise your hand to answer. (Answer: 30)
5. **Say**: Use the table to find the answer to 72 ÷ 4. Raise your hand to answer. (Answer: 18)
6. **Say**: Use the table to find the answer to 148 ÷ 2. Raise your hand to answer. (Answer: 74)
7. **Ask**: What else do you notice in the division table? Raise your hand to answer. (Answer: There are Xs in the table.)

8. **Say**: Yes, there are Xs instead of an answer in some spaces because the numbers cannot be divided exactly. For example, 72 ÷ 5 = 14 with a remainder of 2. We are going to explore quotients that do not have a remainder and use division tables to find the answer.

Guided Practice *(7 minutes)*

1. Draw the following division table on the board.
2. **Say**: Work with your partner and use the table to answer the following in your exercise book.

÷	145	176	240	250	360
2	X	88	120	125	180
3	X	X	80	X	X
4	X	44	60	X	90
5	29	X	48	50	72

a. 176 ÷ 2 = (Answer: 88)
b. 240 ÷ 3 = (Answer: 80)
c. 145 ÷ 5 = (Answer: 29)
d. 360 ÷ 4 = (Answer: 90)
e. 176 ÷ 4 = (Answer: 44)

3. Make sure pupils understand and are doing the task.

Independent Practice *(13 minutes)*

1. Draw the following division table on the board:

÷	98	108	115	116	150
2	49	54	X	58	75
3	X	X	X	X	50
4	X	27	X	29	X
5	X	X	23	X	30

2. **Say**: Work on your own and use the division table to solve the following questions:
   a. 98 ÷ 2 = (Answer: 49)
   b. 108 ÷ 4 = (Answer: 23)
   c. 115 ÷ 5 = (Answer: 27)
   d. 116 ÷ 2 = (Answer: 58)
   e. 150 ÷ 3 = (Answer: 50)

2. Draw the following division table on the board:

÷	54	100	125	180
2	27	50	**X**	90
3	18	**X**	**X**	60
4	**X**	25	**X**	45
5	**X**	20	25	36

3. **Say**: Work on your own and use the division table to solve the following questions:
    a. 180 ÷ 3 = (Answer: 60)
    b. 125 ÷ 5 = (Answer: 25)
    c. 100 ÷ 2 = (Answer: 50)
    d. 54 ÷ 3 = (Answer: 18)
    e. 100 ÷ 4 = (Answer: 25)
4. Have pupils to exchange notebooks and check each other's work as you read the answers aloud.

Closing *(5 minutes)*

1. Draw a division table on the board.

÷	160	175	180	195	200
2	80	**X**	90	**X**	100
3	**X**	**X**	60	65	**X**
4	40	**X**	45	**X**	50
5	32	35	36	39	40

2. **Ask**: Which number is divisible by 2, 3, 4, and 5 with no remainder? Raise your hand to answer. (Answer: 180)
3. **Say**: Work with your partner to find another number that is divisible by all four numbers as well with no remainder.
4. **Say**: Good job today pupils! You can now use a division table to find quotients.

Key word definitions:

- Quotient: the answer to a division problem

Lesson Title: Revision of Division Tables up to 12	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-052	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to use division tables up to 12.	**Teaching Aids** None	**Preparation** Draw the division tables from the lesson on the board.

Opening *(5 minutes)*

1. Write:

÷	**168**	**170**	**176**	**200**	**240**
2	84	85	88	100	120
4	42	**X**	44	50	58
5	**X**	34	**X**	40	48

2. **Say:** Solve the following problems using the table:
   a. 170 ÷ 5 = (Answer: 34)
   b. 176 ÷ 4 = (Answer: 44)
   c. 240 ÷ 5 = (Answer: 48)
   d. 170 ÷ 2 = (Answer: 85)
   e. 168 ÷ 4 = (Answer: 42)
3. **Say:** Explain how you answered. Raise your hand to answer.
4. **Say**: Today you will learn how to use division tables up to 12 to find quotients.

Introduction to the New Material *(5 minutes)*

1. **Say**: Now we will look at division tables from 2 – 12 to find quotients. We will use the same process to find the answer.
2. **Say**: So find 360 in the first column. Find 6 in the first row. Look down from the 360 and across from the 6 to where the paths meet at the answer to 360 ÷ 6.
3. **Ask**: What is the answer to 360 ÷ 6? Raise your hand to answer. (Answer: 60)
4. **Say**: Use the table to solve the problems.

5. Draw the table on the board:

÷	108	210	240	270	360
6	18	**X**	40	45	60
7	**X**	30	**X**	**X**	**X**
8	**X**	**X**	30	**X**	**X**
10	**X**	21	24	25	36
12	9	**X**	20	**X**	30

   a. 240 ÷ 8 = (Answer: 30)
   b. 270 ÷ 10 = (Answer: 27)
   c. 108 ÷ 12 = (Answer: 9)
   d. 210 ÷ 10 = (Answer: 21)
   e. 360 ÷ 6 = (Answer: 60)

6. **Say**: Let's review the answers. Raise your hand to answer.

Guided Practice *(7 minutes)*

1. **Say**: With your partner, use the table to solve the problems.
2. Draw the following table on the board:

÷	120	130	152	162	190
8	15	**X**	19	**X**	**X**
9	**X**	**X**	**X**	18	**X**
10	12	13	**X**	**X**	19
12	10	**X**	**X**	**X**	**X**

3. **Ask:**
   a. 120 ÷ 12 = (Answer: 10)
   b. 152 ÷ 8 = (Answer: 19)
   c. 162 ÷ 9 = (Answer: 18)
   d. 120 ÷ 8 = (Answer: 15)
   e. 190 ÷ 10 = (Answer: 19)

Independent Practice *(13 minutes)*

1. **Say**: On your own, use the table to solve the problems.

2. Draw the following table on the board:

÷	110	128	130	121	320
5	22	**X**	26	**X**	64
8	**X**	16	**X**	**X**	40
11	10	**X**	**X**	11	**X**
10	11	**X**	13	**X**	32

a. 110 ÷ 11 = (Answer: 10)
b. 320 ÷ 5 = (Answer: 64)
c. 128 ÷ 8 = (Answer: 16)
d. 130 ÷ 10 = (Answer: 13)
e. 320 ÷ 8 = (Answer: 40)

3. **Say**: On your own, use the table to solve the problems.
4. Draw the following table on the board:

÷	240	320	360	480
4	60	80	90	120
8	30	40	45	60
10	24	32	36	48
12	20	**X**	30	40

a. 320 ÷ 8 = (Answer: 40)
b. 480 ÷ 10 = (Answer: 48)
c. 240 ÷ 12 = (Answer: 20)
d. 360 ÷ 4 = (Answer: 20)
e. 360 ÷ 8 = (Answer: 45)

Closing *(5 minutes)*

1. Draw the following on the board. **Say:** Let's look at this division table and notice any patterns.
2. Give pupils 1 minute to copy and study the division table.

÷	120	240	360	480
8	15	30	45	60
10	12	24	36	48
11	**X**	**X**	**X**	**X**
12	10	20	30	40

3. **Ask:** Why does the row with 11 have all Xs? Raise your hand to answer. (Answer: Because none of the numbers are divisible by 11.)
4. **Ask**: Can you name a 1-digit number that divides all four numbers: 120, 240, 360, 480. Raise your hand to answer. (Example answers: 1, 2, 3, 4, 5, 6, 8)
5. **Say**: Good job today pupils! You learnt how to use division tables up to 12.

Lesson Title: Division of a Whole Number by a 2-Digit Number (Not Long Division)	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-053	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to divide whole numbers by 2-digit numbers (not long division).	**Teaching Aids** None	**Preparation** Define key vocabulary words: dividend, divisor, quotient. (See below for definition to key vocabulary.)

Opening *(5 minutes)*

1. Write and **say** expand the following:
   a. 170 = (Answer: 100 + 70)
   b. 176 = (Answer: 100 + 70 + 6)
   c. 240 = (Answer: 200 + 40)
   d. 168 = (Answer: 100 + 60 +8)

2. Write and **say** divide the following:
   a. 100 ÷ 2 = (Answer: 50)
   b. 40 ÷ 4 = (Answer: 10)

3. **Say**: Explain your answers. Raise your hand to answer.
4. **Say**: Today you will learn how to divide whole numbers by 2-digit numbers using place value and expansion.

Introduction to the New Material *(5 minutes)*

1. **Say**: In the same way that we were able to divide a number by a single digit, it is also possible to divide a number by a 2-digit divisor.
2. Write: 56 ÷ 14 =
3. **Say**: The 56 is the dividend and the 14 is the divisor. We will divide the 56 by 14 or find how many times 14 goes into 56. Another way to say this is to see how many times you can divide the number 56 into groups of 14
4. **Say**: Write the problem in your exercise books.
5. **Say**: We find how many times 14 can be added together until we get 56
6. Write: 14 + 14 + 14 + 14 = 56. There are 4 groups of 14 in 56 so, 56 ÷ 14 = 4

Guided Practice *(7 minutes)*

1. **Say**: Copy and solve with a partner the following problems:
2. Write:
   a. 36 ÷ 18 = (Answer: 18 + 18 = 36. So, 36 ÷ 18 = 2)
   b. 336 ÷ 24 =

   (Answer: 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24 + 24+ 24 = 336. So, 336 ÷ 24 = 14)

   c. 180 ÷ 20 = (Answer: 20 + 20 + 20 + 20 + 20 + 20 + 20 +20 + 20 = 180. So, 180 ÷ 20 = 9)

d. 44 ÷ 11 = (Answer:11 + 11 + 11 + 11 = 44. So, 44 ÷ 11 = 4)

3. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(13 minutes)*

1. **Say**: Solve the following on your own in your exercise books:
   a. 24 ÷ 12 = (Answer: 12 + 12 = 24. So, 24 ÷ 12 = 2)
   b. 150 ÷ 30 = (Answer: 30 + 30 + 30 + 30 + 30 = 150. So, 150 ÷ 30 = 5)
   c. 160 ÷ 20 = (Answer: 20 + 20 + 20 + 20 + 20 + 20 + 20 + 20 = 160. So, 160 ÷ 20 = 8)
   d. 104 ÷ 12 = (Answer: 12 + 12 + 12+ 12 + 12 + 12 + 12 + 12 = 104. So, 104 ÷ 12 = 7)
   e. 180 ÷ 60 = (Answer: 60 + 60 + 60 = 180. So 180 ÷ 60 = 3)
   f. 68 ÷ 17 = (Answer: 17 + 17 + 17 + 17 = 68. So, 68 ÷ 17 = 4)
2. **Say**: Exchange your notebooks to check each other's work as I read the answers aloud.

Closing *(5 minutes)*

1. **Say**: Let's review the steps we use to solving these division problems by expansion. Write down the following example:
   a. 240 ÷ 24 = (Answer: 24+ 24+ 24+ 24+ 24+ 24+ 24+ 24+24+ 24 = 240. So, 240 ÷ 24 = 10)
2. **Ask:** What is the first step that we must do? Raise your hand to answer. (Answer: Separate 24 into the number of group that add up to 240.)
3. **Ask:** What is the second step that we must do? Raise your hand to answer. (Answer: Count how many divisions of 24 we found.)
4. **Say:** Yes, we counted 10 groups of 24. We can check to see if we are correct. 10 x 24 = 240
5. So now we know, 240 ÷ 24 = 10
6. **Say:** Good job pupils! You can now divide by 2-digit numbers using expansion.

Key vocabulary definitions:

- Dividend: the number you are dividing into groups
- Divisor: the number you are dividing by or how many groups you are trying to find
- Quotient: the answer to a division problem

Lesson Title: Division by Powers of 10	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-054	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes	**Teaching Aids**	**Preparation**
By the end of the lesson, pupils will be able to solve problems using division by 100.	None	None

Opening *(5 minutes)*

1. **Say**: Expand the following as a multiple of 100
   a. 400 = 100 x 4
   b. 1000 = 100 x 10
   c. 300 = 100 x 3
2. **Ask**: How did you find your answers? (Example answers: I found how many groups of 100 are in each number, I divided each number by 100)
3. **Say**: Today you will learn how to solve problems using division by powers of 10.

Introduction to the New Material *(5 minutes)*

1. **Say:** Remember, in a division problem, a 'dividend' is the number being divided. A 'divisor' is the number dividing the dividend. A 'quotient' is the result of the division problem. We reviewed this in the last lesson but we are going to look at problems where the divisor is 100.
2. **Introduce** the pupils to division by 10 using the following explanation.
3. **Say:** In division by a power of 10, the last zero of both the dividend and the divisor cancel each other. It is easier to see this when we make our division problem using a fraction bar.
4. **Say:** For example, 1000 ÷ 10 = 100. Let's write this as a fraction which is a division problem. 1000 ÷ 10 = $\frac{1000}{10}$ = 100
5. **Say**: Here you can see that we can cross out one zero on top and one zero on the bottom.
6. Cross out the zeroes on top and bottom as you say this.
7. **Say**: The zero in the divisor cancels one of the zeros of the dividend. This method is good when both the dividend and divisor have zeros to cancel.
8. **Say:** Additionally, you can also use another method of moving the decimal place to the left by the number of zeros in the divisor.
9. **Say:** Let's look at 4375 ÷ 100. The divisor (100) has two zero. We will take the dividend (4375) and move the decimal two places to the left.
10. Write**:** 4375 ÷ 100 = 43.75
    2 spaces left
11. **Say**: Let's try another problem with moving the decimal place.
12. Write: 1550 ÷ 1000= 1550 ÷ 1000 = 1.550 = 1.55
    2 spaces left
13. **Say**: This method works well if the dividend does not have the same amount of zeros as the divisor. The result is often a decimal. However, you can use either method to solve.

Guided Practice *(7 minutes)*

1. Put pupils in pairs.
2. **Say:** Solve the following problems in your exercise books using either method we learnt today. Note what method you used.
3. Write**:**
   a. 600 ÷ 100 = (Answer: 6, cancelling zeros)
   b. 92 ÷ 10 = (Answer: 9.2, moving decimals)
   c. 340 ÷ 10 = (Answer: 34, cancelling zeros)
   d. 560 ÷ 100 = (Answer: 5.6, moving decimals)
   e. 130 ÷ 10 = (Answer: 13, cancelling zeros)
4. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(13 minutes)*

1. **Say:** Solve the following problems in your exercise books by cancelling zeros to divide.
2. Write**:**
   a. 450 ÷ 10 = (Answer: 45)
   b. 700 ÷ 100 = (Answer: 7)
   c. 980 ÷ 10 = (Answer: 98)
   d. 8400 ÷ 100 = (Answer: 84)
   e. 480 ÷ 10 = (Answer: 48)
3. **Say:** Solve the following problems in your exercise books by moving the decimal place to divide.
4. Write**:**
   a. 7200 ÷ 10 = (Answer: 720)
   b. 2650 ÷ 100 = (Answer: 26.5)
   c. 775 ÷ 100 = (Answer: 7.75)
   d. 37 ÷ 10 = (Answer: 3.7)
   e. 4250 ÷ 100 = (Answer: 42.5)
5. Have pupils to exchange their books and check their work while you read the answers aloud**.**

Closing *(5 minutes)*

1. **Say**: Today we learned how to divide by powers of 10 using two methods.
2. **Ask**: How do you cancel zeros to divide? Raise your hand to answer. (Example answers: If the dividend and divisor both have zeros, you can cancel the zeros in the dividend by how many zeros are in the divisor.)
3. **Ask**: How do you move the decimal to divide? Raise your hand to answer. (Example answers: You move the decimal of the dividend to the left by the number of zeros in the divisor.)
4. **Ask**: Which method should you use for these problems and then solve them?
   a. 4,600 ÷ 100 = (Answer: cancelling zeros method, 46)
   b. 1,730 ÷ 100 = (Answer: moving decimals method, 17.3)

Lesson Title: Word Problems Involving Division up to 1000	**Theme:** Everyday Arithmetic	
Lesson Number: M-05-055	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to solve word problems involving division up to 1000.	**Teaching Aids** None	**Preparation** Copy the word problems from the lesson for pupils or write them on the board.

Opening *(5 minutes)*

1. **Say** and write**:** Divide the following:
   a. 1400 ÷ 10 = (Answer: 140)
   b. 7290 ÷ 100 = (Answer: 72.9)
   c. 160 ÷ 10 = (Answer: 16)
   d. 120 ÷ 100 = (Answer: 1.2)
2. **Ask** pupils to explain how they arrived at their answers. Raise your hand to answer.
3. **Say**: Today we are going to continue dividing by powers of 10 up to 1000 in word problems.

Introduction to the New Material *(5 minutes)*

1. Write**:** Mary had a basket of 200 bananas and needs to separate them into groups of 10 to deliver to restaurants. How many bananas are in each delivery?
2. **Say:** First we will underline the important information to help us set up the problem.
3. Underline 200 bananas and groups of 10.
4. **Say:** We need to divide 200 by 10 so 200 ÷ 10.
5. **Say:** What method for division should we use to solve this word problem? Raise your hand to answer. (Answer: Moving the decimal place one time because there is 1 zero in 10.)
6. Write**:** 200 ÷ 10 = 20.0 = 20
   1 space left
7. **Say**: Each delivery will have 20 bananas in it. We found this by division.
8. **Say:** Remember, you can also eliminate or cancel zeros if both the dividend and divisor have zeroes. For example, 200 and 10 each have zeros. You can take one zero off of 200 because 10 also has one zero and the result will be the same, 20.

Guided Practice *(10 minutes)*

1. Put the pupils in pairs.
2. **Say**: Copy and solve the following word problems. Remember to underline the important information and set up your division problems first. Then you will decide which method for division is best for each word problem.
3. Write the following word problems on the board:
   a. Madam Rose bought 720 pieces of suiting material and sewed them into an equal number of suits among her 10 stores to sell. How many suits will each store receive to sell? (Answer: pieces of material = 720, number of customers = 10, so 720 ÷ 10 = 72 suits per store)

b. John has 600 pens and shares them equally among his 100 classmates. How many pens will each classmate get?

4. (Answer: number of pens = 600, number of mates = 100, so 600 ÷ 100 = 6 pens per classmate)
    a. A total of 840 pairs of football boots were shared among 10 football teams. How many pairs of boots will a team receive? (Answer: number of pairs of boots = 840, number of teams = 10, so 840 ÷ 10 = 84 pairs of boots per team)
    b. A village has 1000 children. How many oranges will each child get if there are 6000 oranges among them?
5. (Answer: number of oranges = 6000, number of children = 1000, so 6000 ÷ 1000 = 8 oranges each)
6. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(10 minutes)*

1. Write**:** Solve the word problems below.
2. **Say:** Remember to underline the important information and set up the problem before solving.
    a. If 210 toffees were shared among 10 children. How many toffees will each child receive? (Answer: 21 toffees)
    b. A farmer planted 100 suckers of banana on a row. If he has 3500 suckers of banana, how many rows will he cover? (Answer: 35 rows)
    c. 20 pupils shared 240 exercise books, how many books will each pupil receive? (Answer: 12 exercise books)
    d. 2700 storybooks were packed into buses to ship. If each bus contains 1000 books, how many buses will be needed to ship all the books? (Answer: 27 buses)
3. Have pupils to exchange their notebooks and check their work while you read the answers aloud.

Closing *(5 minutes)*

1. **Say** and write**:** Solve the following word problems:
    a. A car dealer imported 1,920 saloon cars into his garage. If 10 cars were packed into a container for shipping, how many containers will be required for all the cars? (Answer: 192 containers)
    b. The Ministry of Food and Agriculture in China supplied 1200 storybooks to 100 families in the eastern part of China. How many storybooks will each family get? (Answer: 12 storybooks each)
2. **Ask**: What do you do to the important information in a word problem? Raise your hand to answer. (Answer: underline it)
3. **Ask**: What operation do all these problems use? Raise your hand to answer. (Answer: division)
4. **Say**: Yes, we are dividing by powers of 10 to divide the total amount into smaller groups of 10. Today you learnt how to divide in word problems, good job pupils!

Lesson Title: Developing Mental Strategies for Multiplication of Large Numbers	**Theme:** Multiplication and Division up to 100,000	
Lesson Number: M-05-056	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to develop mental strategies for multiplication with large numbers.	**Teaching Aids** None	**Preparation** Photocopy or draw the tables in the lesson.

Opening *(3 minutes)*

1. Practice times tables for 10, 11 and 12 up to 12
2. Write the following on the board:
   10: 10, 20, 30…
   11: 11, 22, 33…
   12: 12, 24, 36…
3. **Say**: Now finish the products up to 12
4. **Say**: Raise your hand to answer. Answer: (**10**: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120; **11**: 11, 22, 33, 44, 55, 66, 77, 88, 99, 110, 121, 132; **12:** 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 132, 144)
5. **Say:** Today you will learn how to develop mental strategies for multiplication of large numbers.

Introduction to the New Material *(10 minutes)*

1. **Say**: We will use a table strategy to help you understand how to multiply large numbers. This method uses expanding place value and addition. This strategy is one way or method to use to multiply large numbers.
2. **Say**: Try to solve this problem.
3. Write: 852 x 123
4. **Say:** Let's remember how to expand these numbers using their place value.
5. Write**:** 852 = 800 + 50 + 2 and 123 = 100 + 20 + 3
6. **Say:** These numbers are very large, and organising them in a table can help you understand how to multiply them easily.
7. Draw the following on the board. **Say:** Copy this table in your notebooks.

852 x 123	**800**	**50**	**2**	**Totals**
100	80,000	5,000	200	85,200
20	16,000	1000	40	17,040
3	2400	150	6	2556
				14,796

8. **Say** and write: We will put the expanded numbers in the top row and first column and leave the bottom row blank.
9. **Say** and point: Now we will multiply like we did when we used the multiplication table.
10. Complete the products with the pupils.
11. **Say** and point: Add across a row into the 'Totals' column.

Guided Practice *(10 minutes)*

1. **Say**: To use this strategy, first expand the divisor and dividend into Tens, Hundreds, Thousands using place value.
2. Guide pupils to put the broken down numbers into a grid template.
    a. 345 x 12

x	**300**	**40**	**5**	**Totals**
10	3000	400	50	3450
2	600	80	10	690
				4140

    b. 5,645 x 22

x	**5,000**	**600**	**40**	**5**	**Totals**
20	100,000	12,000	800	100	112,900
2	10,000	1200	80	10	11,290
					124,190

3. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(8 minutes)*

1. **Say:** Copy and complete the multiplication problems.
2. Walk around and assist pupils as they expand the numbers and place them in the table. Answer any questions as necessary.
    a. 478 x 16 = (Answer: 7848)

x				**Totals**

b.648 x 76 =

(Answer: 49,248)

x				**Totals**

c. 623 x 89 =

(Answer: 55,447)

x				**Totals**

d. 478 x 98 = (Answer: 46,844)

x				**Totals**

3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(3 minutes)*

1. **Say** and write**:** Expand the following large number:
   34,650,675
2. **Say**: Expanding the large number helps us see how the number is broken down by it's place value.
3. **Ask:** What did we learn about multiplying large numbers today? Raise your hand to answer. (Example answers: long process; stay neat in a table; we must expand the numbers, we must multiply and then add)
4. Allow 4-5 pupils to answer.
5. **Say:** Good, we learnt many things about multiplying large numbers. The table is a good strategy or tool to help us multiply and stay organised.

Lesson Title: Developing Mental Strategies for Division with Large Numbers	**Theme:** Multiplication and Division up to 100,000	
Lesson Number: M-05-057	**Class/Level:** Class 5	**Time:** 35 minutes

Learning Outcomes By the end of the lesson, pupils will be able to develop strategies for division with large numbers.	**Teaching Aids** None	**Preparation** None

Opening *(3 minutes)*

1. Write**:** 'Strategy' on the board.
2. **Ask:** What does 'strategy' mean? Raise your hand to answer. (Example answers: method, way)
3. **Say:** Why do we need strategies for working out division problems? Let's take a look at why.
4. **Say:** In our lives we often share items among people and so we need to understand some different ways to divide the items up. When we divide large amounts up, using estimation and rounding off is a good strategy for dividing.
5. **Say:** For example, a town might need thousands of litres of water for everyone to use. These are large numbers and many people sharing the water. We will need to learn some strategies to help us divide such large numbers.
6. **Say**: Today you will learn how to use estimation for division with large numbers.

Introduction to the New Material *(10 minutes)*

1. **Say** and write**: '**Divide 60,430 ÷ 19'
2. **Say:** This is a very large number to divide so we will round off both numbers to make it easier. Let's start with rounding 60,430 to the nearest thousand.
3. Write: 6<u>0</u>,430 rounded to the indicated place value is 60,000
4. **Say**: First we looked at the number in the hundreds place and see that it is less than 5 so we keep the digit in the thousands place the same and replace the Hundreds, Tens and Ones with zeros.
5. Say: Now we round the divisor. 19 rounded up to the nearest Tens place is 20. Now we can divide these two numbers with ease.
6. Write: 60,000 ÷ 20 = 3000
7. **Say:** This problem is a division problem and if we read it aloud, it says: Twenty divided by two is equal to 10.
8. **Say:** Let's try another example is 14675 ÷ 15 Let's first round the dividend up to the nearest thousand again.
9. Write**: 1<u>4</u>,675 rounded to the indicated place value is 15,000.**
10. **Say:** Now we can see that dividing 15,000 ÷ 15 is much easier.
11. Write**:** 15,000 ÷ 15 = 1000
12. **Say:** Let's try some more examples together.

Guided Practice *(10 minutes)*

1. **Say**: Work with a partner to solve the following problems.
2. Write: 'Solve the following division problems by rounding off to the indicated place and estimate the answer:'
    a. 448 ÷ 46 = (Answer: 450 ÷ 50 = 9)
    b. 743 ÷ 68 = (Answer: 700 ÷ 70 = 10)
    c. 338 ÷ 23 = (Answer: 300 ÷ 20 = 15)
    d. 36,432 ÷ 298= (Answer: 36,000 ÷ 300 = 120)
3. Walk around the room, check work, discuss and assist where necessary.

Independent Practice *(10 minutes)*

1. **Say**: Copy the problems. Use the split strategy to solve them on your own.
2. Write:
    a. 423 ÷ 22 = (Answer: 400 ÷ 20 = 20)
    b. 565 ÷ 25 = (Answer: 600 ÷ 25 = 24)
    c. 6064 ÷ 32= (Answer: 6060 ÷ 30 = 202)
    b. 5758 ÷ 27 = (Answer: 6000 ÷ 30 = 200)
    c. 7047 ÷ 73 = (Answer: 7000 ÷ 70 = 100)
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(2 minutes)*

1. **Ask**: What is the first step to using estimation as a strategy for division. Raise your hand to answer. (Answer: Round to the indicated or easiest place value.)
2. **Say**: Yes, once you have rounded off the numbers, you will find that the division is much easier.
3. **Say**: Good job today pupils! You used estimation and rounding off to help divide large numbers.

Lesson Title: Estimating Multiplication Problems up to 100,000	**Theme:** Multiplication and Division up to 100,000	
Lesson Number: M-05-058	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to estimate multiplication problems up to 100,000.	 **Teaching Aids** None	 **Preparation** None

Opening *(3 minutes)*

1. Write**:** 'estimate' on the board.
2. **Ask:** What does this word mean? Raise your hand to answer.
   (Example answers: guess, prediction)
3. **Say:** We use estimation to help us guess or predict the size of large quantities.
4. **Say:** Also, when numbers are very large, we can round them up or down to a number that is easier to multiply or divide. For example, numbers that are multiples or 10 or 5 are often easier to multiply or divide.
5. Write the following on the board: 2098
6. **Say**: We will practice rounding these numbers to the nearest whole number that is a multiple of 5, 10 or one hundred.
7. **Underline** the 98 in the number and **say**: we will round the 98 up because it is very close to 100, which is an easier number to multiply and divide. Thus we will round to the nearest hundreds place.
8. Write**:** 2098 rounded up to the nearest hundreds place is 2100.
9. **Say**: Today you will learn how to estimate multiplication problems with very large numbers.

Introduction to the New Material *(10 minutes)*

1. **Say:** We are going to estimate the answers to some multiplication problems.
2. Write**:** Let's look at this example: 42 x 29
3. **Say:** To work this out, we need to first round the numbers. These numbers will be rounded to the tens place.
4. **Ask:** If we round 42, what do we get? Raise your hand to answer. (Answer: 40)
5. **Ask:** If we round 29, what do we get? Raise your hand to answer. (Answer: 30)
6. **Say:** We can then multiply 40 x 30 to get the estimate of 1200
7. **Say:** Estimate 34 x 78
8. **Ask:** What do we do to 34? Do we round up or down to the nearest ten? Raise your hand to answer. (Answer: down to 30)
9. **Ask**: What about 78? Do we round up or down to the nearest ten? Raise your hand to answer. (Answer: Up to 80)
10. **Ask:** What do we do after rounding the numbers? Raise your hand to answer.
    (Answer: Multiply 30 x 80)
11. **Ask:** So what is our estimated product? Raise your hand to answer. (Answer: 2400)
12. **Say**: Estimate 5678 x 678.

13. **Say**: 5678 is larger and we will round to the nearest thousand.
14. **Underline** the thousands place.
15. **Ask:** Can you round 5678 to the nearest thousand? 678 to the nearest hundred?
16. **Say** and write**:** Check your answers: (Answer: 6000 and 700)
17. **Say** and write**:** The estimated product is 6000 x 700 = 4,200,000.

Guided Practice *(8 minutes)*

1. Put pupils in pairs.
2. Write**:** Round to the underlined place value and find the products using estimation.
    a. 3456 x 879 = (Answer: 3000 x 900 = 2,700,000)
    b. 2367 x 546 = (Answer: 2000 x 550 = 1,100,000)
    c. 34256 x 987 = (Answer: 34,000 x 1000 = 34,000,000
3. Walk around the room, check work, discuss and assist where necessary.
4. Invite pupils to the board to answer the questions.
5. **Say:** Check your work with the answers on the board.

Independent Practice *(10 minutes)*

1. Write:
    a. An airline owns 42 airplanes. There are 74 seats on each airplane. About how many seats in total are there on the airplanes? (Answer: 2800)
    b. Each extension cord is 31 feet long. What is the total length of 59 extension cords? (Answer: 1800)
    c. A law firm ordered 99 boxes of paper clips. There were 745 paper clips in each box. About how many paper clips did the law firm order in all? (Answer: 75,000)
    d. Each correct answer on a game show is worth 49 points. Last night, a contestant answered 39 questions correctly. About how many points did the contestant earn? (Answer: 2000)
    e. The Corner Cafe ordered 70 boxes of sugar packets. Each box contained 57 packets of sugar. About how many sugar packets in total did The Corner Cafe order? (Answer: 4200)
2. Have pupils to exchange their books and check each other's work as you read the answer aloud.

Closing *(4 minutes)*

1. **Say** and write: Do this class challenge: Estimate the product 35678 x 3786 (Round to the indicated place value. (Answer: 40,000 x 4000 = 160,000,000)
2. Review answer with the class.
3. **Say**: Good job today pupils! You used rounding off as a method for multiplying large numbers!

Lesson Title: Estimating Division Problems up to 100,000	**Theme:** Multiplication and Division up to 100,000	
Lesson Number: M-05-059	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to estimate division problems up to 100,000.	 **Teaching Aids** None	 **Preparation** Write the word problems for the independent practice on the board.

Opening *(3 minutes)*

1. **Say:** We are going to look at estimation in division just like we used estimation for multiplication problems. Remember we must round numbers to a specific place value first. Let's practice this.
2. Write and **review** the following problems on the board:
    a. 456 (Answer: 460)
    b. 1985 (Answer: 2000)
3. **Say**: Today you will learn how to use estimation to solve division problems of large numbers.

Introduction to the New Material *(10 minutes)*

1. **Say:** In order to estimate products and quotients, we must first round numbers to a specific place value.
2. Write**:** Let's look at this example: 125 ÷ 14.
3. **Ask:** Can anyone estimate the answer? How?
4. Give some time and then proceed with explanation of rounding below.
5. **Say:** To work this out, we need to first round the numbers.
6. **Ask:** If we round up 125 to the nearest ten, what do we get? Raise your hand to answer. (Answer: 130)
7. **Ask:** If we round down 14 to the nearest one, what do we get? Raise your hand to answer. (Answer: 10)
8. **Say:** 130 ÷ 10 gives us an estimated quotient of 13
9. Write and **say:** Estimate 364 ÷ 38
10. **Ask:** What do we do to 364? Do we round up or down to the nearest Ten? Raise your hand to answer. (Answer: down to 360)
11. **Ask**: What about 38? Do we round up or down to the nearest Ten? Raise your hand to answer. (Answer: up to 40)
12. **Ask:** What do we do after rounding the numbers? Raise your hand to answer. (Answer: 360 ÷ 40)
13. **Ask:** So what is our estimate? Raise your hand to answer. (Answer: 90)
14. **Ask**: Estimate 5765 ÷ 29
15. **Say:** Round 5678 to the nearest thousand. Round 29 to the nearest Ten.
16. **Say** and write**:** Check your work. (Answer: 6000, 30)
17. **Ask:** What is the estimate? Raise your hand to answer. (Answer: 6000 ÷ 30 = 200)

Guided Practice *(8 minutes)*

1. **Say** and write**:** Work in pairs to estimate the following problems, round to the indicated place:
    a. 4436 ÷ 219
    b. 78643 ÷ 396
    c. 999 ÷ 14
2. Walk around the room. Discuss answers with pupils and assist when pupils need help.
3. **Say** and write**:** Let's review your answer to the estimation problems.
    a. 4400 ÷ 220 = 20
    b. 80000 ÷ 400= 200
    c. 1000 ÷ 10= 100

Independent Practice (*10 minutes)*

1. Write:
    a. A carpenter needs 225 nails. If there are 60 nails per box, about how many boxes will he buy?

    (Answer: about 4 boxes)

    b. A restaurant has 375,000 SLL to buy new plates. If the cost of each plate is 4,000 SLL, about how many plates will the restaurant be able to buy? Round the numbers and provide an estimate. (Answer: about 94 plates)
    c. Greene County needs 852 pieces of pipe to repair some water lines. If each box contains 3 pieces of pipe, about how many boxes should the county buy? Round the numbers and provide an estimate. (Answer: about 280 boxes)
    d. A school supply company is giving away free chalkboards to promote their dust-free chalk. The company can spend up to 5,608,000 SLL on the chalkboards. If each chalkboard costs the company 60,000 SLL, about how many chalkboards will they be able to give away? Round the numbers and provide an estimate. (Answer: about 94 chalkboards)
2. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. **Ask:** What is the first step to estimating a division problem with large numbers? Raise your hand to answer. (Answer: You must first round the numbers.)
2. **Ask**: Again, what does the word 'estimation' mean? Raise your hand to answer.
3. (Example answers: a rough guess, an approximation)
4. **Say**: Yes, when we estimate division problems with large numbers, we round the numbers and provide a rough guess of the answer. They are not exact but a good estimate.
5. **Say**: Good job today pupils! You rounded and estimated solutions for division problems with large numbers!

Lesson Title: Interpreting the Remainder in Division Sums	**Theme:** Multiplication and Division up to 100,000	
Lesson Number: M-05-060	**Class/Level:** Class 5	**Time:** 35 minutes

 **Learning Outcomes** By the end of the lesson, pupils will be able to interpret the remainder in division sums.	 **Teaching Aids** None	 **Preparation** Write the word problems in the independent practice on the board.

Opening *(3 minutes)*

1. **Say**: We will use what we know about expansion and division to interpret the remainder in division sums.
2. **Say**: Let's practice expanding a few numbers first.
3. Write:
   27 = ____ + ____ (Answer: 20 + 7)
   49 = ____ + ____ (Answer: 40 + 9)
   67 = ____ + ____ (Answer: 60 + 7)
4. **Say:** Today we are going to learn to interpret remainder in division sums by using what we know about expanding and dividing by sums.

Introduction to the New Material *(10 minutes)*

1. **Say:** 'Remainder' means the surplus or the leftover in dividing something into equal groups.
2. **Ask:** Who has ever shared or divided something among friends equally and had some left over? Raise your hand if you have divided something among your friends.
3. **Ask:** Do you remember what you shared? How many items were there and how many friends had to share those items? Raise your hand to answer. (Possible answers: supplies; food; money)
4. Write and **say**: Let's look at 27 ÷ 4. We will use the following steps to solve the problem:
   First let's expand 27 into parts that are easily divisible by 4.
   27 ÷ 4 = (20 + 7) ÷ 4
5. **Say**: We can divide 7 further because 3 + 4 = 7.
6. Write:
   27 ÷ 4 = (20 + 4 + 3) ÷ 4
   Distribute and divide:
   (20 ÷ 4) + (4 ÷ 4) + (3 ÷ 4) = 5 + 1 = (3÷4) = 6 R3
5. **Say**: Notice that 3 cannot be divided by 4 exactly. This will be our remainder. So our answer will be 6 with a remainder of 3.
7. **Ask:** There are 19 sweets to be shared among 4 children. How many will each child get? Let's expand 19 and then divide to see the remainder. (Answer: 4 R3)
   Write **and say:**
   19 ÷ 4 = (16 + 3) ÷ 4
   Distribute and divide:
   (16 ÷ 4) + (3 ÷ 4) = 4 + (3÷4) = 4 R3

8. **Ask:** 7 children are sharing 50 pebbles for their art projects. How many pebbles will each child get? (Answer: 7 R1)
9. Write **and say:**
   50 ÷ 7 = (49 + 1) ÷ 7
   Distribute and divide:
   (49 ÷ 7) + (1 ÷ 4) = 7 + (3÷4) = 7 R1
10. **Say**: It is important that you remember your multiplication times tables to do these problems! Look back at your times tables that you wrote in previous lessons.

Guided Practice *(10 minutes)*

1. **Say:** Work in pairs to solve the following problems:
   a. 153 ÷ 15 = (Answer: (153 = 150 + 3) ÷ 15 = (150 ÷15) + (3 ÷ 15) = 10 R3)
   b. 78 ÷ 10 = (Answer: (78 = 70 + 8) ÷ 10 = (70 ÷10) + (8 ÷ 10) = 7 R8)
   c. 89 ÷ 2 = (Answer: (89 = 80 + 8 + 1) ÷ 2 = (80 ÷2) + (8 ÷ 2) + (1 ÷ 2) = 40 + 4 + (1 ÷ 2) = 44 R1)
   d. 112 ÷ 10 = (Answer: (112 = 110 + 2) ÷ 10 = (110 ÷10) + (2 ÷ 10) = 11 R2
   e. 121 ÷ 5 = (Answer: (121 = 120 + 1) ÷ 5 = (120 ÷5) + (1 ÷ 5)= 24 + (1 ÷ 5)= 24 R1)
2. Walk around the room. Discuss answers with pupils and assist when pupils need help.

Independent Practice *(8 minutes)*

1. **Say**: Copy the problems in your book and use expansion to answer the questions.
2. Write:
   e. Sasha's Floral Shop needs to mail 13 checks to the bank. If they can put 2 checks in each envelope, how many checks will be in the final envelope? (Answer: 1 check)
   f. A car dealership needs to transport 167 cars to an island. The ferry can hold a maximum of 8 cars. How many trips will the ferry take with 8 cars each time and how many cars will the ferry take on its last trip? (Answer: 20 trips with 8 cars, 7 cars in the final trip)
   g. The library has 435 magazines. Each bin holds 8 magazines. How many full bins will there be? (Answer: 54 full bins)
3. Have pupils to exchange their books and check their work while you read the answers aloud.

Closing *(4 minutes)*

1. Write the following on the board:
   a. If there is a remainder, could you divide the total evenly? Raise your hand to answer. (Answer: No, the remainder means you cannot divide it evenly.)
   b. Why do you need to know your multiplication times tables well in order to use this method? Raise your hand to answer. (Example answer: it's easier when you know how to divide numbers exactly and multiplication helps this; because multiplication is the opposite operation to division)
2. **Say**: Good job today pupils! You used division sums to interpret the remainder in a division problem.

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